

素数及其快速判定的新方法与应用

潘树明 著

金工业出版社

6.2
b



ISBN 7-5024-3062-8



9 787502 430627 >

ISBN 7-5024-3062-8

0.74 定价 15.00 元

260

0156.2

p181

素数及其快速判定 的新方法与应用

潘树明 著



A1022458

北 京
冶 金 工 业 出 版 社
2002

内 容 简 介

本书在阐述素数的基本理论和基本概念的基础上,介绍了快速判定素数的新定理、新方法及其应用,用这种新方法比传统方法提高判定效率 7~10 倍。此外,本书还介绍了素数性质、奇偶数性质的 22 个定理、双生素数性质的 37 个猜想及 10 个素数猜想。书后附有 300000 以内的素数表。

本书可供数学爱好者阅读,也可供从事数学、计算机工作的人员参考。

Synopsis

Based on the basic theories and concepts of prime numbers, puts forward new theorems, new methods and their application on discrimination of prime numbers increasing discrimination efficiency by 7-10 times, provides 22 theorems on properties of prime numbers and odd and even numbers, 37 conjectures on properties of twin prime numbers, and 10 conjectures on prime numbers. The appendix includes the prime numbers less than 300,000.

This book is applicable for math enthusiast, and it also can be a reference for the people in the field of mathematics and computer.

图书在版编目(CIP)数据

素数及其快速判定的新方法与应用/潘树明著. —北京:
冶金工业出版社, 2002. 8

ISBN 7-5024-3062-8

I. 素… II. 潘… III. 素数—研究 IV. 0156.2

中国版本图书馆 CIP 数据核字(2002)第 050256 号

出版人 曹胜利(北京沙滩嵩祝院北巷 39 号, 邮编 100009)

责任编辑 刘小峰 美术编辑 李 心 责任校对 侯 璐 责任印制 牛晓波

北京鑫正大印刷有限公司印刷; 冶金工业出版社发行; 各地新华书店经销

2002 年 8 月第 1 版, 2002 年 8 月第 1 次印刷

850mm×1168mm 1/32; 4.75 印张; 128 千字; 142 页; 1-2500 册

15.00 元

冶金工业出版社发行部 电话:(010)64044283 传真:(010)64027893

冶金书店 地址: 北京东四西大街 46 号(100711) 电话:(010)65289081

(本社图书如有印装质量问题, 本社发行部负责退换)

前 言

在大于 1 的整数中,除 1 和其本身之外,不被任何数除尽的数称为素数。素数在数论中占有特殊的地位。任何数都可以用素数的乘积表示,所以素数是数中的“原子”,是构成自然数的基本元素。掌握了任何一个数的素因子分解,数学家就获得了有关这个数的信息。人们一直把素数判定取得的结果看成是人们的重要精神财富。在试验新计算机的效率和硬件性能时,用素数构成多位数,以便为材料加密。在现代数学应用中,例如编码时,就需要讨论某些类别有限域及其上的多项式。这些有限域就是由素数 P 做成的 $Z/PZ = \{\overline{0}, \overline{1}, \dots, \overline{P-1}\}$,这就要求我们必须去寻找素数、判定素数。

素数判定从古至今一直受到人们重视,是因为素数判定这个问题具有很大的理论价值和实用价值。

本书中所列出的作者多年来研究的素数判定的新定理、新方法比一般常用的筛选法可提高计算速度 7~10 倍,具有准确、效率高的特点。利用这些定理可以引出一个双生素数定理:“大于 5 的两个差为 2 的相邻双生素数有无限多个,而且每对双生素数之间相差之数为 6 的倍数。”

数学家卡尔·弗里德列希·高斯 (Karl Friedrich Gauss) 曾经说过:“高等算术中一些最美丽的定理具有这样的特性:它们极易从经验事实中归纳出来,但是证明却隐藏很深,只有高人一等的研究者才能把它们挖掘出来。正是出于这种原因,赋予高等算术以神奇魅力,使之成为第一流数学家们最喜爱的科学。至于它远远凌驾于数学的其他分支之上的无限丰富性,就更不必提了。”

本书也将作者与数学家廖震合作多年研究出的素数性质、奇偶数性质 22 个定理及推论刊出。如能为初等数论内容起到添砖加瓦的作用,作者将感到十分荣幸。

在数学中,数论是最美的一个分支,从古至今,一直受到专家和数学爱好者的偏爱,而双生素数是美中之美的数。本书也给出了作者对双生素数性值的 37 个猜想和 10 个素数猜想。数学猜想是数学发展的一个重要思维方式。它具有创新性,尽管这种猜想目标很具体,且正确与否有待于人们去证明。

本书中也给出了 30 万以内的素数,以便于研究和使用者查找。

本书在编写过程中,由潘锋工程师承担了全部中译英工作和打字工作。在此对廖震、潘锋、李总成先生的帮助表示衷心感谢。

尽管书中内容不太完善,作者借 ICM-2002 国际数学大会之机将此书献给广大数学家及数学爱好者。由于水平所限和时间仓促,不足之处难免,欢迎批评指正。

潘树明

2002 年 6 月

Preface

Prime number is the number which can not be divided by any number except for 1 and itself. Prime numbers play important role in number theory. Any number can be expressed as the product of prime numbers, so prime numbers are 'atoms' of numbers – basic elements of natural numbers. Once grasping prime factor explosion for a number, mathematicians obtain information about this number. People always regard the result of discrimination of prime numbers as important spirit treasure. During efficiency and hardware testing of a new computer, multi – digit number is made of prime numbers to encrypt confidential materials. The more important usage is in modern application mathematics, for example, certain limited regions are required to be discussed in encoding. These limited regions are $Z/PZ = \{\bar{0}, \bar{1}, \dots, \overline{P-1}\}$ made up of prime number P , which asks us to look for prime numbers and discriminate prime numbers.

Discrimination of prime numbers has been all along thought highly of, for it has great theoretical and practical value.

This book lists new theorems and methods on discrimination of prime numbers being studied for many years by the author, which can increase computation speed by 7 – 10 times comparing with normal filters and so are accurate and efficient. With these theorems, there comes out a twin prime numbers theorem: "there are infinite neighboring twin prime numbers larger than 5 in which the difference of the two numbers is 2, and the difference of every pair of twin prime numbers is a multiple of 6."

Mathematician Karl Friedrich Gauss has ever stated: "some

beautiful theorems in higher arithmetic have such attributes: they are easily concluded from experiences but deeply concealed for proving. Only super mathematicians can dig them out. Just for this reason, higher arithmetic has amazing charm and becomes the favorite of excellent mathematicians. Even no need to comment on its infinite abundance beyond other branches of mathematics."

This book also lists 22 theorems and deductions on properties of prime numbers and odd and even numbers being studied by Pan Shuming and Mathematician Liao Zhen for many years. If they can be supplemented for number theory, the author will be greatly honored.

In mathematics, number theory is the most beautiful branch and twin prime numbers are beautiful – in – beautiful. This book also lists 37 conjectures of twin prime numbers and 10 conjectures on prime numbers made out by the author. Conjectures in mathematics are an important thinking method. It has innovation, though this kind of conjectures have concrete targets and are under proving.

This book also provides prime numbers less than 300,000 for researchers' and users' convenience.

During the writing, Mr. Pan Feng took on the whole translation and typing job. The author is greatly grateful to Mr. Liao Zhen, Pan Feng and Li Zongcheng here. The author would like to present this book to mathematicians during ICM – 2002. Because of ability limit and time shortage, there may be inevitable deficiencies. If you have any comments and suggestions, please let the author know.

Pan Shuming
June, 2002

目 录

1	素数判定的新定理、新方法	(1)
1.1	素数判定的新定理	(2)
1.2	比较	(3)
1.3	讨论	(6)
1.4	判定素数应用举例	(7)
1.5	结论	(9)
2	双生素数的性质以及有关素数的猜想	(10)
3	素数、奇偶数的性质及定理	(13)
	参考文献	(20)

Catalogue

1	New Theorems and Methods for Discrimination of Prime Numbers	(21)
1.1	New theorem for discrimination of prime number	(22)
1.2	Comparison	(24)
1.3	Discussion	(28)
1.4	Application examples in discrimination of prime numbers	(29)
1.5	Conclusion	(31)
2	Properties of Twin Prime Numbers and Conjectures on Prime Numbers	(33)
3	Properties and Theorems of Prime Numbers and Odd and Even Numbers	(37)

References (46)

附录:30 万以内素数表

Appendix: List of prime numbers less than
300,000 (47)

1 素数判定的新定理、新方法

本章提出了素数判定的新定理、新方法。用本章提出的新定理、新方法可提高运算速度,并引出大于 5 的双生素数有无限多个,每对双生素数之间相差之数为 6 的倍数。本章提出的定理及方法在计算机科学、研究 RSA 密钥码体制中、大素数寻找、计算数论中有广泛的应用。

在历史上,素数曾吸引了大批数学家:高斯(Gauss)、费马(Fermat)、欧拉(Euler)、勒让德(Legendre)花费大量的精力和时间研究它。高斯在他的《算术讨论》(*Disquisitiones Arithmeticae*)中曾这样写到:“把素数同合数鉴别开来及将合数分解成素因子乘积被认作是算术中最重要、最有用问题之一。”中国的《易经》一书也对这个重要问题做了研究。

将合数分解成素因子的乘积是算术基本定理的构造性方面之需要。在快速数论变换中研讨的 Z/nZ 的乘法群的构造就依赖于将 n 分解为素因子的乘积。要具体建立 RSA 体制(鲁梅利(Rumely)、沙米尔(Shamir)、埃德勒曼(Adleman)三人发明的公开密钥码体制)就需要两个大素数,就必须寻找大素数问题。在现代计算机科学发展中,人们用计算的观点研讨数学分支理论体系——数论,形成了当前重要的分支——计算数论。计算数论中重要组成部分就是素数判别。不难看出,素数判定对计算机科学来说是有十分重要价值的。

计算数论中提出:是否存在判别素数的多项式方法,是当前悬而未决的难题之一。

对于素数判定,从古至今,曾提出了许多方法,但仍认为“试除法”是最简单的素数判别法。和其相关的埃拿托申斯(Eratosthenes)筛选法对制作素数表起了重大的作用。当今,人们多么希望尽早找到一种素数判别的多项式算法,然而这尚需进一步去研

究。在尚未找到素数判别多项式法之前,能否找到比“试除法”更简便的计算快速的运算方法、素数判别的新定理、新方法?本章就是针对这一问题,为解决这一问题寻找到一个比“试除法”更简便、计算速度提高几倍的素数判定新定理、新方法。

1.1 素数判定的新定理

定理: $n \in \mathbf{N}$, $f(n) = 6n \pm 1$ 数列自然数中划去能被小于 $\sqrt{f(n)}$ 的素数整除之数,添上 2 和 3 两个数,即为全部素数。

证明: 设数列 5, 7, 11, 13, 17, 19, ..., n

$$P_0 = 5, P_1 = 7, P_3 = 11, \dots, P_r \leq \sqrt{n} < P_{r+1}$$

将数列中依次划去:

$$\begin{aligned} &5P_0, 7P_0, 11P_0, 13P_0, \dots \\ &5P_1, 7P_1, 11P_1, 13P_1, \dots \\ &5P_2, 7P_2, 11P_2, 13P_2, \dots \\ &\dots \\ &5P_r, 7P_r, 11P_r, 13P_r, \dots \end{aligned} \quad (1-1)$$

此后所剩下的数,都不能被 P_0, P_1, \dots, P_r 各素数所整除。假设所剩下的数中有其复合数:

$$Q = d \times P_m$$

其中, Q 为 n 内的数, P_m 为不同于 P_0, P_1, \dots, P_r 的素因数, d 和 P_m 都是大于 1 的整数,故 $Q = d \times P_m \leq n$ 。由于 $n \in \mathbf{N}$, 又小于 \sqrt{Q} 的整数都除不尽,所以 $d > \sqrt{Q}, P_m > \sqrt{Q}$, 而得 $d \times P_m > \sqrt{Q} \times \sqrt{Q} = Q$, 这与 $d \times P_m = Q$ 是相矛盾的。所以如果 $n \in \mathbf{N}$, 而小于 \sqrt{Q} 的整数都除尽,则 Q 不是素数。由上所述, Q 是复合数,则 Q 一定有 $n \in \mathbf{N}$ 而小于 \sqrt{Q} 的因数。由于 $n \in \mathbf{N}$, 则 Q 的大于 1 的最小因数一定是素数,所以 $f(n) = 6n \pm 1$ 中将式 1-1 中划去之后所剩下的数都不能被 P_0, P_1, \dots, P_r 各素数所整除,因此 Q 必定是素数,应有下式:

$$Q < \sqrt{n} < P_{r+1}$$

d 是 $r+1$ 个中某一个素数,必在式 1-1 中被划除,故 n 内所剩之数均为素数,故式 1-1 可简化为:

$$\begin{aligned} &P_0^2, 5P_0, 7P_0, 11P_0, \dots \\ &P_1^2, 7P_1, 11P_1, 13P_1, \dots \\ &P_2^2, 11P_2, 17P_2, 19P_2, \dots \\ &\dots \end{aligned}$$

定理证毕。

1.2 比较

例:判定 100 内的素数,逐一列出。

解:运用前述定理 $f(n) = 6(n) \pm 1$, 列出 $n = 1, 2, 3, \dots, 16$ 时的数,即:5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 共 32 个。

$\sqrt{100}$ 内大于 5 的素数为 5, 7。

将 100 内的复合数逐次划去:

划去被 5 整除的数(5 除外),即:

25, 35, 55, 65, 85, 95。

划去被 7 整除的数(7 除外),即:

49, 77, 91。

再根据定理,将 2、3 两个素数放入,得出 100 以内的全部素数是:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 共 25 个。

为了对比说明本定理的优点,用现在应用的一般方法(非本文定理方法)判定 $n = 100$ 内的素数有哪些。

列出:(1 除外)从 2, 3, 4, 5, \dots , 99, 100 数列将 100 内复合数逐次一一划去,即将 100 内能被 2, 3, 5, 7 整除的数划去。

划去被 2 整除的数(2 除外,49 个):

4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100。

划去被 3 整除的数(3 除外,16 个):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99。

划去被 5 整除的数(5 除外,6 个):

25, 35, 55, 65, 85, 95。

划去被 7 整除的数(7 除外,3 个):

49, 77, 91。

所剩余的数如下:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 即为 100 以内的全部素数。用一般方法判定 100 以内素数要划去的次数为: $49 + 16 + 6 + 3 = 74$ (次), 而用本定理要划去的次数为: $6 + 3 = 9$ (次), 减少了 65 次。

例:判定 200 内的全部素数有哪些?

解:用本文提出的定理的做法。

用 $f(n) = 6n \pm 1$ 列出 $n = 1, 2, \dots, 33$ 时所有的数:

5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199。

$\sqrt{200}$ 内大于 5 的素数是:5, 7, 11, 13。

将 200 内复合数逐次划去:

划去被 5 整除的数(5 除外):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185。

划去被 7 整除的数(7 除外):

49, 77, 91, 119, 133, 161。

划去被 11 整除的数(11 除外):121, 143, 187。

划去被 13 整除的数(13 除外):169。

再根据本定理,将 2、3 两个素数放入,得出 200 以内全部素数是:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 共 46 个。

为了对比说明,对此例使用非本文定理的方法判定 $n = 200$ 内的素数。具体做法是:

列出(1 除外)2, 3, 4, 5, ..., 199, 200 数列,将 200 以内复合数逐次一一划去,即将 $\sqrt{200}$ 内能被 2, 3, 5, 7, 11, 13 整除的数划去:

划去被 2 整除的数(2 除外,99 个):

4, 6, 8, 10, ..., 198, 200

划去被 3 整除的数(3 除外,32 个):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99, 105, 111, 117, 123, 129, 135, 141, 147, 153, 159, 165, 171, 177, 183, 189, 195

划去被 5 整除的数(5 除外,12 个):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185。

划去被 7 整除的数(7 除外,6 个):

49, 77, 91, 119, 133, 161。

划去被 11 整除的数(11 除外,3 个):

121, 143, 187。

划去被 13 整除的数(13 除外,1 个):

169。

所剩下的数如下:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199。

用一般方法判定 200 以内素数要划去的次数为： $99 + 32 + 12 + 6 + 3 + 1 = 153$ (次)，而用本定理要划去的次数为： $12 + 6 + 3 + 1 = 22$ (次)，减少了 $153 - 22 = 131$ (次)。

表 1-1 用本定理方法和用一般筛选法判定素数划去次数的比较

判定方法	100 内	200 内	1000 内
用一般方法划去次数	74	153	825
用本定理法划去次数	9	22	94

从表 1-1 看出，用本定理给出的素数判定新方法比一般通用的筛素数法减少筛(划去)次数大约 7~10 倍，可以说提高效率或者提高计算速度 7~10 倍。说明用本定理去做“素数判别”具有效率高、速度快 7~10 倍的优点。

1.3 讨论

直观地讲，我们列出以 6 为公差的 6 个数列如下：

第一个数列：2, 8, 14, 20, 26, 32, 38, 44

第二个数列：3, 9, 15, 21, 27, 33, 39, 45

第三个数列：4, 10, 16, 22, 28, 34, 40, 46

第四个数列：6, 12, 18, 24, 30, 36, 42, 48

第五个数列：5, 11, 17, 23, 29, 35, 41, 47

第六个数列：7, 13, 19, 25, 31, 37, 43, 49

本定理给出的素数判定方法，巧妙地运用公差为 6 的上述六个等差级数中的第五个、第六个两个，即素数(补充 2 和 3 两数)集中在第五个、第六个两个数列，在这两个数列中要筛去的数即复合数中均有一个素数因子在其中，例如运用本定理给出的方法求 $f(n) = 1000$ 内的素数有哪些？列出 $6n \pm 1$ 的数列，要筛去被 5

整除的数可归结为一个公式: $5 + 5(n \pm 1) \times 6$,要筛去被 7 整除的可归纳一个公式 $7 + 30(n - 1)$,要筛去的被 13 整除的归纳为 13 乘以 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73 诸素数,要筛去的被 17 整除的归纳为 17 乘以 17, 19, 23, 29, 31, 37, 41, 43, 47, 53 诸素数,要筛去的被 23 整除的归纳为 23 乘以 23, 29, 31, 37, 41, 43 诸素数。要筛去被 29 整除的归纳为 29 乘以 29, 31 两个素数,要筛去被 31 整除的只有一个即 $961 = 31 \times 31$,即素数 31^2 。

1.4 判定素数应用举例

例:判定 4999 是否素数。

解: $\sqrt{4999} = 70.7036$,用本定理给出的公式 $f(n) = 6n \pm 1$ 列出数列,式中 $n = 1, 2, 3, \dots, 10, 11$,相应的数列为:5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67。

因为 $\sqrt{70.7036} = 8.4$,即用小于 8 的素数 5 和 7 整除上数列(2、3 两素数除外)。划去被 5 整除的数:25, 35, 55, 65;划去被 7 整除的数:49。余下的素数为:

5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67。用这些素数除 4999,均不能整除,故 4999 为素数。

例:判定 128431 是否素数。

解: $\sqrt{128431} = 258.37$,用本定理给出的公式 $f(n) = 6n \pm 1$ 列出数列,式中 $n = 1, 2, 3, \dots$,相应的数列为:5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199, 203, 205, 209, 211, 215, 217, 221, 223, 227, 229, 233, 235, 239, 241, 245, 247, 251, 253, 257。

因为 $\sqrt{258.37}=16.07$,即用小于 16 的素数 5, 7, 11, 13 去整除上数列。划去被 5 整除的数:25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185, 205, 215, 235, 245;划去被 7 整除的数:49, 77, 91, 119, 133, 161, 203, 217;划去被 11 整除的数:121, 143, 187, 209, 253;划去被 13 整除的数:169, 221, 247。余下的素数为:5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 115, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 211, 223, 227, 229, 233, 239, 241, 251, 257。用这些数除 128431,发现均不能整除,故 128431 是素数。

根据前述定理可以提出一个关于双生素数定理:

大于 5 的两个近邻素数相差 2 的双生素数有无限多个,而且每对双生素数之间相差的数为 6 的倍数。

如:5, 7; 11, 13; 17, 19; 29, 31; 41, 43; 59, 61; 71, 73; 101, 103; 107, 109; 137, 139; 191, 193; 197, 199; 227, 229, ...

双生素数 5, 7 和 11, 13 之间 $11-5=6, 13-7=6$;双生素数 11, 13 和 17, 19 之间 $17-11=6, 19-13=6$;双生素数 29, 31 和 41, 43 之间 $41-29=12, 43-31=12$;...

证明: $n \in \mathbb{N}, f(n)=6n \pm 1$,可写为 $f(n)=5+6(n-1)$ 和 $f(n)=7+6(n-1)$ 两个数列($n=1, 2, \dots, \infty$),得出两个公差为 6 的等差级数。分别按本定理求出各素数,划掉复合数(含素因子)之后,余下的素数间隔为 6 的倍数;将两个数列合在一起,由于数列 $f(n)=5+6(n-1)$ 和 $f(n)=7+6(n-1)$ 相差为 2,故双生素数相差为 2。

下面再用反证法证明本题:假设双生素数有很多个,共有 n 个,就是 $P_1, P_2, P_3, \dots, P_n$,其中 $P_1=5, P_2=7, P_3=11, P_4=13, \dots$ 。令 $Q=P_1, \dots, P_{n+1}$,如果 Q 是双生素数,则因 Q 不等于 $P_1, P_2, P_3, \dots, P_n$ 中的任何一个,故双生素数的个数最少有 n

+1 个,与双生素数的个数共有 n 个相矛盾,故不是 n 个而是有无限多个,和 $f(n)=6n \pm 1$ 数列 ($n=1, 2, \dots, \infty$) 有无限多个相一致。

1.5 结论

(1) 定理: $n \in \mathbf{N}$, $f(n)=6n \pm 1$ 数列自然数中划去所有能被小于 $\sqrt{f(n)}$ 的素数整除的数,添上 2 和 3 两个数,即为全部素数。

(2) 运用本定理可判定素数。与试除法、埃拿托申斯(Eratosthenes)筛选法相比,划去的次数仅是 $1/7 \sim 1/10$ 。

(3) 利用本定理可以引出一个双生素数定理:大于 5 的两个近邻素数相差 2 的双生素数有无限多个,而且每对双生素数之间相差之数为 6 的倍数。

2 双生素数的性质以及有关素数的猜想

邻近两个素数之差为 2 的相邻素数称为双生素数或素数对，素数对有无限多个，有如下性质：

- (1) 两个素数对之差为偶数。
- (2) 每对素数之间相差之数为 6 的倍数(能被 2 和 3 整除)。
- (3) 素数对的两个数平方和为偶数。
- (4) 素数对的两个数平方差为偶数。
- (5) 大于 11 的素数对两个数中较大素数的平方的个位数字为 1,3 或 9。
- (6) 大于 11 的素数对两个数中较小素数的平方的个位数字为 1,7 或 9。
- (7) 每个素数对的两个素数平方为奇数,以 1 或 9 为个位数字。
- (8) 每个素数对的两个素数平方和为偶数,以 0 或 2 为个位数字。
- (9) 每个素数对的两个素数平方差为偶数,以 0,2 或 8 为个位数字。
- (10) 每个素数对的两个素数之积为奇数,以 3 或 9 为个位数字。
- (11) 每个素数对的两个素数中较大的数除以较小的数得到的商为小于 2 的递减的数。
- (12) 每个素数对的两个素数中较小的数的立方为奇数,以 1,3 或 9 为个位数字。
- (13) 每个素数对的两个素数中较大的数的立方为奇数,以 1,7 或 9 为个位数字。
- (14) 每个素数对的两个素数立方和是以 0,2 或 8 为个位数字的数。

(15) 每个素数对的两个素数立方差是以 2 或 6 为个位数字的数。

(16) 素数对中两个素数的平方积为奇数,以 1 或 9 为个位数字。

(17) 素数对中两个素数的平方和为偶数,以 0 或 2 为个位数字。

(18) 素数对中每个数的四次方的个位数字均为 1。

(19) 素数对中两个数的四次方之和是个位数字为 2 的数。

(20) 素数对中两个数四次方之差是 10 的倍数(个位数字为 0 的数)。

(21) 素数对中两个数四次方之积是个位数字为 1 的数。

(22) 素数对中每一个数的五次方的个位数字与素数对本身的个位数字相同。

(23) 素数对中每一个数的五次方减去本身是 10 的倍数(个位数字为 0 的数)。

(24) 素数对中每一个数的五次方的乘积是个位数字为 3 或 9 的数。

(25) 素数对中每一个数的六次方是个位数字为 1 或 9 的奇数,与其平方的个位数字相同。

(26) 素数对中每一个数的七次方的个位数字中较小的一个是个位数字为 1,3 或 9 的奇数。

(27) 素数对中每一个数的七次方的个位数字中较大的一个是个位数字为 1,7 或 9 的奇数。

(28) 每个素数对的两个素数七次方之和是个位数字为 0,2 或 8 的数。

(29) 每个素数对的两个素数七次方之差是个位数字为 2 或 6 的数。

(30) 素数对中每一个数的八次方的个位数字均为 1。

(31) 素数对中两个数八次方之和是个位数字为 2 的数。

(32) 素数对中两个数八次方之差是 10 的倍数(个位数字为

0 的数)。

(33) 素数对中两个数八次方之积是个位数字为 1 的数。

(34) 素数对中每一个数的九次方的个位数字与素数对本身的个位数字相同。

(35) 素数对中每一个数的九次方减去本身是 10 的倍数(个位数字为 0 的数)。

(36) 素数对中每一个数的九次方的乘积是个位数字为 3 或 9 的数。

(37) 素数对中每一个数的十次方的个位数字是个位数字为 1 或 9 的奇数,与其平方的个位数字相同。

有关素数的猜想:

(1)任何素数 九 次方的个位数与素数本身的个位数相同。

(2)任何素数 六 次方的个位数与素数本身的个位数相同。

(3)任何素数 六 次方与其立方之差均为偶数。

(4)任何素数 六 次方与其立方之和均为偶数。

(5)任何素数 六 次方与其四次方之差均为偶数。

(6)任何素数 六 次方与其四次方之和均为偶数。

(7)大于等于 七 的任何素数的八次方的个位数为 1。

(8)大于等于 七 的素数的八次方减去 1 均为 10 的倍数。

(9)任何素数 十 次方与其平方之差为 10 的倍数。

(10)任何素数 十一 次方的个位数与其立方的个位数相同。

3 素数、奇偶数的性质及定理^①

定理 1:两个相邻奇数之和加上两个相邻奇数之积为奇数。

证明:设一个奇数为 $2k+1$, 则其相邻奇数为 $2k+3$,

$$(2k+1) + (2k+3) = 2(2k+2)$$

由 $(2k+2) \in \mathbf{Z}$ 得出 $2(2k+2)$ 为偶数。

再设另一个奇数为 $2k_1+1$, 其相邻奇数为 $2k_1+3$,

$$\begin{aligned}(2k_1+1) \times (2k_1+3) \\&= 4k_1^2 + 8k_1 + 3 \\&= (4k_1^2 + 8k_1 + 2) + 1 \\&= 2(2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

由 $(2k_1^2 + 4k_1 + 1) \in \mathbf{Z}$ 得出 $2(2k_1^2 + 4k_1 + 1) + 1$ 为奇数。

因此:

$$\begin{aligned}2(2k+2) + 2(2k_1^2 + 4k_1 + 1) + 1 \\&= 2(2k+2 + 2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

因为 $2(2k+2 + 2k_1^2 + 4k_1 + 1)$ 为偶数, 所以 $2(2k+2 + 2k_1^2 + 4k_1 + 1) + 1$ 为奇数。

命题证毕。

定理 2:两个相邻奇数之和减去任意一个奇数, 其差为奇数。

证明:设一个奇数为 $2k+1$, 则其相邻奇数为 $2k+3$ ($k \in \mathbf{Z}$), 于是得

$$\begin{aligned}(2k+1) + (2k+3) - (2k_1+1) \\&= 4k+4 - 2k_1 - 1 \\&= 2(2k - k_1 + 1) + 1\end{aligned}$$

因为 $k \in \mathbf{Z}$ 且 $(2k - k_1 + 1) \in \mathbf{Z}$, 所以 $2(2k - k_1 + 1) + 1$ 为奇

① 本章定理由廖震、潘树明共同研究编写。

数。

命题证毕。

定理 3:任何一个大于 3 的奇自然数可表达为相邻自然数之和加上这两个自然数之积。

证明:设相邻两自然数为 n_1 和 $n_1 + 1$, 再设大于 3 的奇自然数为 $2n + 1$, 其中 $n \in \mathbf{N}$ 且 $n \geq 2$ 。

$$\text{欲使 } 2n + 1 = [n_1 + (n_1 + 1)] + n_1(n_1 + 1)$$

$$\text{只需 } 2n + 1 = 2n_1 + 1 + n_1^2 + n_1$$

$$2n = n_1^2 + 3n_1$$

$$2n = n_1(n_1 + 3)$$

显然, 左边 $= 2n \geq 4$ (是偶自然数)

右边:

(1) 当 n_1 为奇自然数时, $n_1 + 3$ 为偶自然数。推导出 $n_1(n_1 + 3)$ 为偶自然数。

(2) 当 n_1 为偶自然数时, $n_1 + 3$ 为奇自然数。推导出 $n_1(n_1 + 3)$ 为偶自然数。

当且仅当 $n_1 \in \mathbf{N}$ 且 $n_1 \geq 1$ 时, 则有 $n_1(n_1 + 3) \geq 4$ 。

命题证毕。

定理 4:偶数可以表示为两个相邻偶数之和加上两个相邻偶数之积。

证明:设一偶数为 $2k$ ($k \in \mathbf{Z}$), 两相邻偶数为 $2k_1$ 和 $2k_1 + 2$, 另两个相邻偶数为 $2k_2$ 和 $2k_2 + 2$, ($k_1, k_2 \in \mathbf{Z}$)。

$$\text{欲使 } 2k = [2k_1 + (2k_1 + 2)] + 2k_2(2k_2 + 2)$$

$$\text{只需 } 2k = (4k_1 + 2) + 4k_2^2 + 4k_2$$

$$k = 2(k_2^2 + k_2 + k_1) + 1 \quad (3-1)$$

这是不定方程, 对于任意一个奇数 k , 都能相应地找到 $k_1, k_2 \in \mathbf{Z}$ 的值使式 3-1 成立。

命题证毕。

定理 5:两个相邻的自然数之和加上两个相邻自然数之积为奇自然数。

证明:设一个自然数为 n_1 , 其相邻自然数为 $n_1 + 1$; 另一个自然数为 n_2 , 其相邻自然数为 $n_2 + 1$ 。 n_2 和 $n_2 + 1$ 中必有一个是偶数, 所以 $n_2(n_2 + 1)$ 是偶数。

令 $n_2(n_2 + 1) = 2k$ ($k \in \mathbf{N}$), 则:

$$\begin{aligned} & [n_1 + (n_1 + 1)] + n_2(n_2 + 1) \\ &= 2n_1 + 1 + 2k \\ &= 2(n_1 + k) + 1 \end{aligned}$$

因为 $(n_1 + k) \in \mathbf{Z}$, 所以 $2(n_1 + k) + 1$ 为奇自然数。

命题证毕。

定理 6:两个相邻偶数之和加上两个相邻偶数之积为偶数。

证明:设一个偶数为 $2k_1$ ($k_1 \in \mathbf{Z}$), 其相邻偶数为 $2k_1 + 2$; 设另一个偶数为 $2k_2$, 其相邻偶数为 $2k_2 + 2$ 。

$$2k_1 + (2k_1 + 2) = 4k_1 + 2 = 2(2k_1 + 1)$$

因为 $2(2k_1 + 1)$ 为偶数, $2k_2(2k_2 + 2)$ 显然是偶数, 所以:

$$[2k_1 + (2k_1 + 2)] + [2k_2(2k_2 + 2)] = 2[2k_1 + 1 + k_2(2k_2 + 2)] \text{ 为偶数, } [2k_1 + 1 + k_2(2k_2 + 2)] \in \mathbf{Z}.$$

命题证毕。

定理 7:任何正偶数可以写成两个奇数的平方和。

证明:设这个正偶数为 $2n$ ($n \in \mathbf{N}$), 两个奇数分别是 $2k_1 + 1$ 和 $2k_2 + 1$, ($k_1, k_2 \in \mathbf{Z}$)。

$$\text{要证明 } 2n = (2k_1 + 1)^2 + (2k_2 + 1)^2$$

$$\text{只需 } 2n = 4k_1^2 + 4k_1 + 1 + 4k_2^2 + 4k_2 + 1$$

$$2n = 2(2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1)$$

因为 $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 \in \mathbf{Z}$, 所以可令 $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a \in \mathbf{Z}$, 只需 $2n = 2a$, 即 $n = a$ 。

显然, 在 $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a$ 中的 k_1 和 k_2 值存在 (这是不定方程), 命题证毕。

另一个证明方法: 设两个奇数为 $2k_1 + 1$ 和 $2k_2 + 1$ ($k_1, k_2 \in \mathbf{Z}$), 正偶数为 $2k$ ($k \in \mathbf{N}$)。

欲使 $2k = (2k_1 + 1)^2 + (2k_2 + 1)^2$

只需 $2k = 4(k_1^2 + k_2^2 + k_1 + k_2) + 2$

$$k = 2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1$$

显然这里的 k_1 和 k_2 是存在的,

命题证毕。

定理 8:任何正奇数可以写成三个相同奇数的平方和。

证明:设这个正奇数为 $2k + 1$, ($k \in \mathbf{Z}$ 且 $k \geq 0$)。

要证明 $2k + 1 = 3(2k_1 + 1)^2$ ($k_1 \in \mathbf{Z}$)

只需 $2k + 1 = 12k_1^2 + 12k_1 + 3$

$$2k = 12k_1^2 + 12k_1 + 2$$

$$k = 6k_1^2 + 6k_1 + 1$$

$$6k_1^2 + 6k_1 + (1 - k) = 0$$

命题证毕。

定理 9:从奇(偶)自然数列第二项起,每一项的平方减去它的前一项的平方差所成的新数列是公差为 8 的等差数列。

证明: $a_n = (2n + 1)^2 - (2n - 1)^2 = 8n$ ($n \in \mathbf{N}$)

而 $a_n - a_{n-1} = 8n - 8(n - 1) = 8$ (常数)

$$b_n = (2n + 2)^2 - (2n)^2 = 8n + 4 \quad (n \in \mathbf{N})$$

$$b_n - b_{n-1} = (8n + 4) - [8(n - 1) + 4] = 8 \text{ (常数)}$$

命题证毕。

定理 10:自然数的平方减去它本身的差等于它本身与比它小的相邻自然数之积。

证明:设此自然数为 n 。

$$n^2 - n = n(n - 1)$$

命题证毕。

定理 11:自然数的平方加上它本身的和等于它本身与比它大的相邻自然数之积。

证明:设此自然数为 n ($n \in \mathbf{N}$)

$$n^2 + n = n(n + 1)$$

命题证毕。

定理 12:两个相邻自然数的平方差为奇数。

证明:设 $n \in \mathbf{N}$ 。

$$(n+1)^2 - n^2 = n^2 + 2n + 1 - n^2 = 2n + 1$$

命题证毕。

定理 13:任何奇自然数可以表示为两个相邻自然数的平方差(大数减小数)。

证明:设 $n \in \mathbf{N}$ 。

$$2n + 1 = n^2 - n^2 + 2n + 1 = (n+1)^2 - n^2$$

命题证毕。

定理 14:大于 3 的素数的平方为奇数。

证明:设大于 3 的素数为 p , p 必为奇数, 令 $p = 2n + 1$ ($n \in \mathbf{N}$ 且 $n > 1$):

$$p^2 = (2n + 1)^2 = 4n(n + 1) + 1$$

因为 $4n(n + 1)$ 为偶数, 所以 $4n(n + 1) + 1$ 为奇数。

命题证毕。

定理 15:大于 3 的素数的立方为奇数。

证明:设大于 3 的素数为 p , p 为奇数, 令 $p = 2n + 1$ ($n \in \mathbf{N}$ 且 $n > 1$):

$$p^3 = (2n + 1)^3 = 2n(4n^2 + 6n + 3) + 1$$

因为 $2n(4n^2 + 6n + 3)$ 为偶数, 所以 $2n(4n^2 + 6n + 3) + 1$ 为奇数。

命题证毕。

定理 16:大于 3 的素数的平方减去它的本身的差为以 0, 2 或 6 为个位数字的偶数。

证明:设大于 3 的素数为 p , p 必须为奇数。

$$p^2 - p = p(p - 1)$$

因为 $p - 1 > 0$, 所以 $p^2 - p$ 为两个连续自然数之积, 为偶自然数。

而素数 p 的个位数字为 1, 3, 7 或 9。

$$\begin{aligned}
\text{所以} \quad & (10n+1)^2 - (10n+1) \equiv 0 \pmod{10} \\
& (10n+3)^2 - (10n+3) \equiv 6 \pmod{10} \\
& (10n+7)^2 - (10n+7) \equiv 2 \pmod{10} \\
& (10n+9)^2 - (10n+9) \equiv 2 \pmod{10}
\end{aligned}$$

其中, $n \in \mathbf{N}$

命题证毕。

定理 17: 大于 3 的素数的立方减去它本身的差为以 0, 4 或 6 为个位数字的偶数。

证明: 设大于 3 的素数为 p , p 为奇数。

$$p^3 - p = (p-1)p(p+1)$$

$p^3 - p$ 等于三个连续自然数之积, 所以 $6 \mid (p^3 - p)$ 。

而素数 p 的个位数字为 1, 3, 7 或 9。

所以 $(10n+1)^3 - (10n+1) \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$

$$(10n+3)^3 - (10n+3) \equiv 4 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+7)^3 - (10n+7) \equiv 6 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+9)^3 - (10n+9) \equiv 6 \pmod{10} \quad (n \in \mathbf{N})$$

所以 $p^3 - p$ 为以 0, 4 或 6 为个位数字的偶数。

命题证毕。

定理 18: 大于 7 的素数的 4 次方的个位数字必为 1。

证明: 设大于 7 的素数为 p , p 为奇数, 而奇数的个位数字必为 1, 3, 7 或 9。

$$(10n+1)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+3)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+7)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+9)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

命题证毕。

定理 19: 素数的 5 次方的个位数字和此素数本身的个位数相同。

证明: 设此素数为 p , 当 $p=2$ 时, $2^5=32$, 而 32 的个位数字为 2(本身)。

当 $p \neq 2$ 时, p 必为奇数, 其个位数字必为 1, 3, 7 或 9。

$$(10n + 1)^5 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^5 \equiv 3 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^5 \equiv 7 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^5 \equiv 9 \pmod{10} \quad (n \in \mathbf{N})$$

命题证毕。

推论 1: 素数的 5 次方加上它本身的和为偶数。

推论 2: 素数的 5 次方减去它本身的差必为 10 的倍数。

定理 20: 素数的 6 次方减去它本身的差必为偶数。

证明: 设此素数为 p 。

$$p^6 - p = p(p^5 - 1) = p(p - 1)(p^4 + p^3 + p^2 + p + 1)$$

因为 $p(p - 1)$ 为两个连续自然数之积, 所以 $p(p - 1)$ 为偶数。

所以 $p^6 - p$ 为偶数。

命题证毕。

定理 21: 素数的 6 次方减去它本身的平方必为 10 的倍数。

证明: 设此素数为 p 。

当 $p = 2$ 时, $2^6 - 2^2 = 64 - 4 = 60$, 命题成立。

当 $p \neq 2$ 时, p 必为奇数, 而 p 的个位数字必为 1, 3, 7 或 9。

$$(10n + 1)^6 - (10n + 1)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^6 - (10n + 3)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^6 - (10n + 7)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^6 - (10n + 9)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

命题证毕。

定理 22: 大于 5 的素数的立方减去比它小的素数的立方差必为偶数。

证明: 设 p_G 为大于 5 的素数, p_L 为小于 5 的素数, 且 $p_G > p_L$, 所以 p_G 和 p_L 均为奇数。

设 $p_G = 2k_1 + 1$, $p_L = 2k_2 + 1$ ($k_1, k_2 \in \mathbf{Z}$ 且 $k_1 > k_2$)。

所以 $p_G^3 - p_L^3 = (2k_1 + 1)^3 - (2k_2 + 1)^3$

$$= 2(k_1 - k_2)[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3]$$

而 $(k_1 - k_2) \in \mathbf{N}$, $[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3] \in \mathbf{N}$

所以上式右边为偶数。

命题证毕。

参 考 文 献

- 1 孙琦, 旷京华. 素数判定与大数分解. 沈阳: 辽宁教育出版社, 1987
- 2 何宝起. 基原素数论. 大连: 大连出版社, 1998
- 3 潘树明. 数理统计在冶金中的应用. 有色矿山, 1983
- 4 陈景润. 初等数论. 北京: 科学出版社, 1978

Prime Numbers and a new Method of Discrimination and its Application

Pan Shuming

1 New Theorems and Methods for Discrimination of Prime Numbers

This chapter brings forward "a New theorem and method for discrimination of prime numbers". Using the new theorem and method in this paper may improve calculating speed and introduce that there are unlimited amount of twin prime numbers great than 5, the difference of every pair of twin prime numbers is a multiple of 6. The theorem and method given in this paper will have extensive application in computer science, RSA Key system research, big prime number finding and computing number theory.

Prime numbers discrimination has been paid great attention from ancient time. In the history, this question attracted a lot of mathematician, for example, Gauss, Fermat, Euler and Legedre to spend great time on research. Gauss wrote in his Disquistions Arithmeticae: To make prime numbers distinguished with composite numbers and to decompose composite numbers into prime factors is the most import and useful question in arithmetic. Chinese Book of Changes also made research to this important question.

To decompose composite numbers into prime factors is the demand of constructive aspect of arithmetic basic theorem. The construction of multiplication groups of Z/nZ discussed in the quick

number theory conversion just depends on decomposing n into product of prime factors. Two big prime numbers are required in setting up RSA system (the open key system invented by Rumely, Shamir, Adleman). In modern computer science development, people use viewpoints of computing to research mathematics branch theory system—number theory, which forms currently important branch—computation number theory. The important component in computation number theory is discrimination of prime numbers. It is not difficult to make out that discrimination of prime numbers is most valuable to computer science.

It is put forward in the computation number theory that whether multinomial method in computation number theory exists or not is still a pending problem nowadays.

From ancient time up to now, many methods have been put forward for discrimination of prime numbers. It is well-known that the Dividing Attempt Method is the simplest discrimination of prime numbers. The relevant Eratosthenes filtering method plays an important role in making prime numbers table. Today, people wish to find out a kind of multinomial arithmetic for discrimination of prime number as soon as possible. It is still under research. Is it possible to find out a new easier theorem and method in the case that multinomial method can not be found in discrimination of prime number? For this question, a new theorem and method easier than the Dividing Attempt Method is introduced in this paper.

1.1 New theorem for discrimination of prime number

Theorem:

Among natural numbers in $f(n) = 6n \pm 1$ number sequence (where $n \in \mathbf{N}$), remove numbers which can be divided exactly by prime numbers less than $\sqrt{f(n)}$, then add 2 and 3 at the begin-

ning, it can make up all prime numbers.

Proving: suppose a number sequence 5, 7, 11, 13, 17, 19, ..., n

$$P_0 = 5, P_1 = 7, P_3 = 11, \dots, P_r \leq \sqrt{n} < P_{r+1}$$

Remove the following from the above sequence:

$$\begin{aligned} &5P_0, 7P_0, 11P_0, 13P_0, \dots \\ &5P_1, 7P_1, 11P_1, 13P_1, \dots \\ &5P_2, 7P_2, 11P_2, 13P_2, \dots \\ &\dots \\ &5P_r, 7P_r, 11P_r, 13P_r, \dots \end{aligned} \quad (1-1)$$

Any of the remains can not be divided exactly by any of prime numbers P_0, P_1, \dots, P_r . Suppose there is a composite number Q in the remains:

$$Q = d \times P_m$$

where Q is a number less than n , P_m is a prime factor different from P_0, P_1, \dots, P_r . Both d and P_m are integers great than 1, so $Q = d \times P_m \leq n$. Because $n \in \mathbf{N}$ and integers which are less than \sqrt{Q} can not be divided by exactly, thus $d > \sqrt{Q}$ and $P_m > \sqrt{Q}$, which makes $d \times P_m > \sqrt{Q} \times \sqrt{Q} = Q$ and conflicts with $d \times P_m = Q$. If $n \in \mathbf{N}$ and integers which are less than \sqrt{Q} can all be divided by exactly, Q is not a prime number. As a result, Q is a composite number, Q should have factors less than \sqrt{Q} ($n \in \mathbf{N}$). Because $n \in \mathbf{N}$, the smallest factor of Q greater than 1 must is a prime number, the remains in $f(n) = 6n \pm 1$ after removing numbers in formula (1-1) can not be divided exactly by any of prime numbers P_0, P_1, \dots, P_r , so Q must be a prime number, resulting the following formula:

$$Q < \sqrt{n} < P_{r+1}$$

d is one of these $r + 1$ prime numbers and must be removed in formula (1-1), the remains in n are all prime numbers, so formula (1-1) may be simplified as:

$$\begin{aligned} &P_0^2, 5P_0, 7P_0, 11P_0, \dots \\ &P_1^2, 7P_1, 11P_1, 13P_1, \dots \\ &P_2^2, 11P_2, 17P_2, 19P_2, \dots \\ &\dots \end{aligned}$$

The proposition is proved.

1.2 Comparison

Example: Discriminate prime numbers within 100, and list them.

Solution:

Using $f(n) = 6(n) \pm 1$, list out numbers where $n = 1, 2, 3, \dots, 16$. Those are 5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97. Total count is 32.

The prime numbers great than 5 and less than $\sqrt{100}$ are 5 and 7

Remove composite numbers less than 100 in turn:

Remove numbers can be divided exactly by 5 (except for 5):
25, 35, 55, 65, 85, 95.

Remove numbers can be divided exactly by 7 (except for 7):
49, 77, 91.

According to this theorem, put two prime numbers 2 and 3 in and makes out all prime numbers less than 100:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97. Total count is 25.

To describe the excellence of this theorem by comparison, we uses general method (not the method in this paper) to discriminate

prime numbers within $n = 100$.

Remove composite numbers less than 100 from 2, 3, 4, 5, ..., 99, 100 number sequence (except for 1) in turn, that is to remove numbers less than 100 which can be divided exactly by 2, 3, 5, 7.

Remove numbers which can be divided exactly by 2 (except for 2, total count is 49):

4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100.

Remove numbers which can be divided exactly by 3 (except for 3, total count is 16):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99.

Remove numbers which can be divided exactly by 5 (except for 5, total count is 6):

25, 35, 55, 65, 85, 95.

Remove numbers which can be divided exactly by 7 (except for 7, total count is 3):

49, 77, 91.

The remains are as follows:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97. These are all prime numbers less than 100.

The removing times is $49 + 16 + 6 + 3 = 74$, whereas removing times with new theorem is $6 + 3 = 9$, which drops 65.

Example: Discriminate all prime numbers less than 200.

Solution: use the method in this theorem.

Use $f(n) = 6n \pm 1$ ($n = 1, 2, \dots, 33$) to list:

5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47,

49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199.

Prime numbers less than $\sqrt{200}$ are 5, 7, 11, 13.

Remove composite numbers less than 200 in turn:

Remove numbers which can be divided exactly by 5 (except for 5):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185.

Remove numbers which can be divided exactly by 7 (except for 7):

49, 77, 91, 119, 133, 161.

Remove numbers which can be divided exactly by 11 (except for 11):

121, 143, 187.

Remove numbers which can be divided exactly by 13 (except for 13):

169.

Then put two prime numbers 2 and 3 in according this theorem, making out all prime numbers less than 200:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199. Total count is 46.

For comparison, this subject uses current method to discriminate all prime numbers less than $n = 200$, the concrete way is:

List number sequence 2, 3, 4, 5, ..., 199, 200 (except for 1), remove composite numbers less than 200 in turn, that is to remove numbers less than $\sqrt{200}$ which can be divided exactly by 2, 3, 5, 7, 11, 13:

Remove numbers which can be divided exactly by 2 (except for 2, total count is 99):

4, 6, 8, 10, ..., 198, 200.

Remove numbers which can be divided exactly by 3 (except for 3, total count is 32):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99, 105, 111, 117, 123, 129, 135, 141, 147, 153, 159, 165, 171, 177, 183, 189, 195.

Remove numbers which can be divided exactly by 5 (except for 5, total count is 12):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185.

Remove numbers which can be divided exactly by 7 (except for 7, total count is 6):

49, 77, 91, 119, 133, 161.

Remove numbers which can be divided exactly by 11 (except for 11, total count is 3):

121, 143, 187.

Remove numbers which can be divided exactly by 13 (except for 13, total count is 1):

169.

the remains are as follows:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199.

The removing times is $99 + 32 + 12 + 6 + 3 + 1 = 153$.

The removing times with this theorem is $12 + 6 + 3 + 1 = 22$. It drops $153 - 22 = 131$.

Table 1-1 Comparison of removal times with general method and with this theorem

Different method	Within 100	Within 200	Within 1000
Removal times with general method	74	153	825
Removal times with this theorem	9	22	94

From the table1-1, it is obviously that the removal times with this theorem is 7 – 10 times less than that of general method, which means efficiency or computing speed rises up 7 – 10 times. It means that discrimination of prime numbers with this theorem has excellence of high efficiency and speed up 7 – 10 times.

1.3 Discussion

For easy to watch, we list out six number sequences in which the difference of two neighbor numbers is 6:

The first sequence: 2, 8, 14, 20, 26, 32, 38, 44

The second sequence: 3, 9, 15, 21, 27, 33, 39, 45

The third sequence: 4, 10, 16, 22, 28, 34, 40, 46

The forth sequence: 6, 12, 18, 24, 30, 36, 42, 48

The fifth sequence: 5, 11, 17, 23, 29, 35, 41, 47

The sixth sequence: 7, 13, 19, 25, 31, 37, 43, 49

The removing method in this theorem use skillfully the fifth and sixth of these six sequence of which the difference is 6. In the two sequences, each composite number to be removed has a prime factor.

For example, use the method in this theorem to discriminate prime numbers less than 1000. List out sequence $6n \pm 1$.

The numbers to be removed which can be divided exactly by 5 are in formula: $5 + 5(n \pm 1) \times 6$

The numbers to be removed which can be divided exactly by 7

are in formula: $7 + 30(n - 1)$.

The numbers to be removed which can be divided exactly by 13 are the result of 13 multiplying prime numbers 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73 separately.

The numbers to be removed which can be divided exactly by 17 are the result of 17 multiplying prime numbers 17, 19, 23, 29, 31, 37, 41, 43, 47, 53 separately.

The numbers to be removed which can be divided exactly by 23 are the result of 23 multiplying prime numbers 23, 29, 31, 37, 41, 43 separately.

The numbers to be removed which can be divided exactly by 29 are the result of 29 multiplying prime numbers 29, 31 separately.

The numbers to be removed which can be divided exactly by 31 is just 31 multiplying 31, that is 961.

1.4 Application examples in discrimination of prime numbers

Example: Discriminate whether 4999 is a prime number

Solution: $\sqrt{4999} = 70.7036$, use the formula $f(n) = 6n \pm 1$ given in this theorem to list sequence. When $n = 1, 2, 3, \dots, 10, 11$, the relative sequence is 5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67.

Because $\sqrt{70.7036} = 8.4$, we use prime numbers less than 8 (5 and 7) to divide exactly by the above sequence (except for 2 and 3). Remove numbers which can be divided exactly by 5: 25, 35, 55, 65, then number which can be divided exactly by 7: 49. The remains are prime numbers 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67. Because 4999 can not be divided exactly by any of these prime numbers, so it is a prime number.

Example: Discriminate whether 128431 is a prime number.

Solution: $\sqrt{128431} = 258.37$, use the formula $f(n) = 6n \pm 1$

given in this theorem to list sequence. When $n = 1, 2, 3, \dots$, the relative sequence is 5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199, 203, 205, 209, 211, 215, 217, 221, 223, 227, 229, 233, 235, 239, 241, 245, 247, 251, 253, 257.

Because $\sqrt{258.37} = 16.07$, we use prime numbers less than 16 (5, 7, 11, 13) to divide exactly by the above sequence. Remove numbers which can be divided exactly by 5: 25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185, 205, 215, 235, 245; remove numbers which can be divided exactly by 7: 49, 77, 91, 119, 113, 161, 203, 217; remove numbers which can be divided exactly by 11: 121, 143, 187, 209, 253; remove numbers which can be divided exactly by 13: 169, 221, 247. The remains are prime numbers 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 115, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 211, 223, 227, 229, 233, 239, 241, 251, 257. Because 128431 can not be divided exactly by any of these prime numbers, so 128431 is a prime number.

Example: According to the description in this paper, a theorem on twin prime numbers can be made out as follows:

There are unlimited numbers of twin prime numbers greater than 5 for which the difference of two neighbor numbers is 2, and the difference of each pair of twin prime numbers is a multiple of 6.

For example: 5, 7; 11, 13; 17, 19; 29, 31; 41, 43; 59, 61; 71, 73; 101, 103; 107, 109; 137, 139; 191, 193; 197, 199; 227, 229, \dots .

For twin prime numbers 5, 7 and 11, 13, there exists $11 - 5 = 6$, $13 - 7 = 6$; for twin prime numbers 11, 13 and 17, 19, $17 - 11 = 6$, $19 - 13 = 6$; for twin prime numbers 29, 31 and 41, 43, $41 - 29 = 12$, $43 - 31 = 12, \dots$.

Proving: $n \in \mathbf{N}$, $f(n) = 6n \pm 1$ can be written in two sequences $f(n) = 5 + 6(n - 1)$ and $f(n) = 7 + 6(n - 1)$ ($n = 1, 2, \dots, \infty$), making out two arithmetical progressions of which difference is 6. Discriminate any of prime numbers according to this theorem, after removing composite numbers (containing prime factors), the difference of remain prime numbers is a multiple of 6. Join the two sequences together, because the discrepancy of sequences $f(n) = 5 + 6(n - 1)$ and $f(n) = 7 + 6(n - 1)$ is 2, the difference of prime numbers is 2.

Now use apagoge to prove the solution.

Suppose there are n twin prime numbers, i. e. $P_1, P_2, P_3, \dots, P_n$, where $P_1 = 5, P_2 = 7, P_3 = 11, P_4 = 13, \dots$.

let $Q = P_1, \dots, P_{n+1}$, if Q is a twin prime number, because Q is not any of $P_1, P_2, P_3, \dots, P_n$, the count of twin prime numbers is at least $n + 1$, which conflicts with that the count of twin prime numbers is n . So the count is unlimited, which is coincident with sequence $f(n) = 6n \pm 1$ (where $n = 1, 2, \dots, \infty$), instead of n .

1.5 Conclusion

(1) Theorem: Among natural numbers in $f(n) = 6n \pm 1$ number sequence (where $n \in \mathbf{N}$), remove numbers which can be divided exactly by prime numbers less than $\sqrt{f(n)}$, then add 2 and 3 at the beginning, it can make up all prime numbers.

(2) Discrimination of prime numbers can be done with this theorem. To compare with Dividing Attempt Method and Eratosthenes Removal Method, removal times are only one-tenth to one-seventh.

(3) A theorem for twin prime numbers can be introduced using this theorem: there are infinite amount of twin prime numbers greater than 5, the difference of every pair of twin prime numbers is a multiple of 6.

2 Properties of Twin Prime Numbers and Conjectures on Prime Numbers

The neighboring prime numbers of which the difference is 2 is called a prime number pair. The number of prime number pairs is infinite. The prime number pairs have following properties:

(1) The difference of two prime number pairs is an even number.

(2) The difference of every two prime number pairs is a multiple of 6, which can be divided evenly by 2, 3.

(3) The sum of squares of two numbers in a prime number pair is an even number.

(4) The difference of squares of two numbers in a prime number pair is an even number.

(5) In a prime number pair larger than 11, the units digit of the square of the larger number is 1, 3, 9.

(6) In a prime number pair larger than 11, the units digit of the square of the smaller number is 1, 7, 9.

(7) The units digit of the squares of two prime numbers in every prime number pair is an odd number, is 1, 9.

(8) The units digit of the sum of squares of two numbers in a prime number pair is an even number of which units digit is 0 or 2.

(9) The units digit of the difference of squares of two numbers in a prime number pair is an even number of which units digit is 0, 2 or 8.

(10) The product of two numbers in a prime number pair is an odd number of which units digit is 3, 9.

(11) The quotient of the larger one divided by the smaller one

of two numbers in a prime number pair is a descending number less than 2.

(12) The units digits of the cube of the smaller one of two prime numbers in every prime number pair is an odd number of which units digit is 1, 3, 9.

(13) The units digits of the cube of the smaller one of two prime numbers in every prime number pair is an odd number of which units digit is 1, 7, 9.

(14) The sum of cubes of two numbers in a prime number pair is an even number of which units digit is 0, 2, 8.

(15) The difference of cubes of two numbers in a prime number pair is an even number of which units digit is 2, 6.

(16) The product of squares of two numbers in a prime number pair is an odd number of which units digit is 1, 9.

(17) The sum of squares of two numbers in a prime number pair is an even number of which units digit is 0, 2.

(18) The units digit of the fourth power of every number in a prime number pair is always 1.

(19) The sum of the fourth powers of two numbers in a prime number pair is a number of which units digit is 2.

(20) The difference of the fourth power of two numbers in a prime number pair is a multiple of 10 (a number of which units digit is 0).

(21) The product of the fourth power of two numbers in a prime number pair is a number of which units digit is 1.

(22) The units digit of the fifth power of every number in a prime number pair is the same as the units digit of that number.

(23) The difference of the fifth power of every number in a prime number pair and the number itself is a multiple of 10 (a number of which units digit is 0).

(24) The product of the fifth power of every number in a prime number pair is a number of which units digit is 3, 9.

(25) The sixth power of every number in a prime number pair is an odd number of which units digit is 1 or 9, as the same as the units digit of square of that number.

(26) For the units digits of the seventh power of every number in a prime number pair, the smaller units digit is an odd number of which units digit is 1, 3, 9.

(27) For the units digits of the seventh power of every number in a prime number pair, the larger units digit is an odd number of which units digit is 1, 7, 9.

(28) The sum of the seventh power of two numbers in a prime number pair is a number of which units digit is 0, 2, 8.

(29) The difference of the seventh power of two numbers in a prime number pair is a number of which units digit is 2, 6.

(30) The units digit of the eighth power of every number in a prime number pair are always 1.

(31) The sum of the eighth power of two numbers in a prime number pair is a number of which units digit is 2.

(32) The difference of the eighth power of two numbers in a prime number pair is a multiple of 10 (a number of which units digit is 0).

(33) The product of the eighth power of two numbers in a prime number pair is a number of which units digit is 1.

(34) The units digit of the ninth power of every number in a prime number pair is the same as the units digit of that number.

(35) The difference of the ninth power of every number in a prime number pair and the number itself is a multiple of 10 (a number of which units digit is 0).

(36) The product of the ninth power of every number in a

prime number pair is a number of which units digit is 3, 9.

(37) The units digit of the tenth power of every number in a *prime number pair* is an odd number of which units digit is 1 or 9, as the same as the units digit of square of that number.

Conjectures on Prime Numbers:

(1) The units digit of the ninth power of any prime number is the same as the units digit of the prime number.

(2) The units digit of the sixth power of any prime number is the same as the units digit of the prime number.

(3) The difference of the sixth power and the cube of any *prime number* is an even number.

(4) The sum of the sixth power and the cube of any prime number is an even number.

(5) The difference of the sixth power and the forth power of any prime number is an even number.

(6) The sum of the sixth power and the forth power of any prime number is an even number.

(7) The units digit of the eighth power of any prime number greater than or equal to 7 is 1.

(8) The difference of the eighth power of any *prime number* greater than or equal to 7 and 1 is a multiple of 10.

(9) The difference of the tenth power and the square of any prime number is a multiple of 10.

(10) The units digit of the eleventh power of any prime number is the same as the units digit of the cube of the *prime number*.

3 Properties and Theorems of Prime Numbers and Odd and Even Numbers^①

Theorem 1: If the sum of two neighboring odd numbers adds to the product of two neighboring odd numbers, the result is also an odd number.

Proving: suppose an odd number is $2k + 1$ and its neighboring odd number is $2k + 3$, then

$$\begin{aligned}(2k + 1) + (2k + 3) \\ = 2(2k + 2)\end{aligned}$$

Because $(2k + 2) \in \mathbb{Z}$, so $2(2k + 2)$ is an even number.

Suppose another odd number is $2k_1 + 1$ and its neighboring odd number is

$2k_1 + 3$, so

$$\begin{aligned}(2k_1 + 1) \times (2k_1 + 3) \\ = 4k_1^2 + 8k_1 + 3 \\ = (4k_1^2 + 8k_1 + 2) + 1 \\ = 2(2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

Because $(2k_1^2 + 4k_1 + 1) \in \mathbb{Z}$, so $2(2k_1^2 + 4k_1 + 1) + 1$ is an odd number.

Summarizing the above,

$$\begin{aligned}2(2k + 2) + 2(2k_1^2 + 4k_1 + 1) + 1 \\ = 2(2k + 2 + 2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

Because $2(2k + 2 + 2k_1^2 + 4k_1 + 1)$, so $2(2k + 2 + 2k_1^2 + 4k_1 + 1) + 1$ is an odd number.

① The theorems in this chapter is jointly studied and writer by Liao Zhen and Pan Shuming.

The proposition is proved.

Theorem 2: If the sum of two neighboring odd numbers subtracts an odd number, the result is also an odd number.

Proving: suppose an odd number is $2k + 1$ and its neighboring odd number is $2k + 3$ ($k \in \mathbb{Z}$), then

$$\begin{aligned}(2k + 1) + (2k + 3) - (2k_1 + 1) \\ = 4k + 4 - 2k_1 - 1 \\ = 2(2k - k_1 + 1) + 1\end{aligned}$$

Because $k \in \mathbb{Z}$ and $(2k - k_1 + 1) \in \mathbb{Z}$,
so $2(2k - k_1 + 1) + 1$ is an odd number.

The proposition is proved.

Theorem 3: An odd natural number greater than 3 can be expressed as a result of the sum of two neighboring natural numbers plus the product of these two natural numbers.

Proving: suppose two neighboring natural numbers are n_1 and $n_1 + 1$, and an odd number greater than 3 is $2n + 1$ ($n \in \mathbb{Z}$ and $n \geq 2$).

To prove $2n + 1 = [n_1 + (n_1 + 1)] + n_1(n_1 + 1)$,

only to make $2n + 1 = 2n_1 + 1 + n_1^2 + n_1$

i. e. $2n = n_1^2 + 3n_1$

i. e. $2n = n_1(n_1 + 3)$

obviously,

the left $= 2n \geq 4$ (an even natural number)

the right:

(1) when n_1 is an odd natural number, $n_1 + 3$ is an even natural number. So $n_1(n_1 + 3)$ is an even natural number.

(2) when n_1 is an even natural number, $n_1 + 3$ is an odd natural number. So $n_1(n_1 + 3)$ is an even natural number.

Only when $n_1 \in \mathbb{N}$ and $n_1 \geq 1$, $n_1(n_1 + 3) \geq 4$.

The proposition is proved.

Theorem 4: An even number can be expressed as a result of the sum of two neighboring even numbers plus the product of two neighboring even numbers.

Proving: suppose an even number is $2k$ ($k \in \mathbf{Z}$), two neighboring even numbers are $2k_1$ and $2k_1 + 2$, other two neighboring even numbers are $2k_2$ and $2k_2 + 2$ ($k_1, k_2 \in \mathbf{Z}$).

To prove $2k = [2k_1 + (2k_1 + 2)] + 2k_2(2k_2 + 2)$

only to make $2k = (4k_1 + 2) + 4k_2^2 + 4k_2$

i. e. $k = 2(k_2^2 + k_2 + k_1) + 1$ (3-1)

This is an indefinite equation. For any of odd numbers k , it should find out correspondingly k_1 and k_2 ($k_1, k_2 \in \mathbf{Z}$) which make equation (3-1) come into existence.

The proposition is proved.

Theorem 5: The result of the sum of two neighboring natural numbers plus the product of two neighboring natural numbers is an odd natural numbers.

Proving: suppose a natural number is n_1 , its neighboring number is $n_1 + 1$; another natural number is n_2 , its neighboring number is $n_2 + 1$.

either of n_2 and $n_2 + 1$ is an even number, so $n_2(n_2 + 1)$ is an even number.

Let $n_2(n_2 + 1) = 2k$ ($k \in \mathbf{N}$), so:

$$\begin{aligned} & [n_1 + (n_1 + 1)] + n_2(n_2 + 1) \\ &= 2n_1 + 1 + 2k \\ &= 2(n_1 + k) + 1 \end{aligned}$$

Because $(n_1 + k) \in \mathbf{Z}$, so $2(n_1 + k) + 1$ is an odd natural number.

The proposition is proved.

Theorem 6: The result of the sum of two neighboring even numbers plus the product of two neighboring even numbers is an even number.

Proving: suppose an even number is $2k_1$ ($k_1 \in \mathbb{Z}$), its neighboring even number is $2k_1 + 2$; other two neighboring even numbers are $2k_2$ and $2k_2 + 2$.

$$2k_1 + (2k_1 + 2) = 4k_1 + 2 = 2(2k_1 + 1)$$

Because $2(2k_1 + 1)$ is an even number and $2k_2(2k_2 + 2)$ is obviously an even number,

$[2k_1 + (2k_1 + 2)] + [2k_2(2k_2 + 2)] = 2[2k_1 + 1 + k_2(2k_2 + 2)]$ is an even number, where $[2k_1 + 1 + k_2(2k_2 + 2)] \in \mathbb{Z}$.

The proposition is proved.

Theorem 7: Any of positive even numbers can be expressed as the sum of squares of two odd numbers.

Proving: suppose a positive even number is $2n$ ($n \in \mathbb{N}$), two odd numbers are $2k_1 + 1$ and $2k_2 + 1$, ($k_1, k_2 \in \mathbb{Z}$).

To prove $2n = (2k_1 + 1)^2 + (2k_2 + 1)^2$

only to make $2n = 4k_1^2 + 4k_1 + 1 + 4k_2^2 + 4k_2 + 1$

i. e. $2n = 2(2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1)$

because $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 \in \mathbb{Z}$, let $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a \in \mathbb{Z}$, so only to prove $2n = 2a$, i. e. $n = a$.

Obviously the values of k_1 and k_2 in $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a$ (this is an indefinite equation) exist, so the proposition is proved.

Another proving: suppose two odd numbers are $2k_1 + 1$ and $2k_2 + 1$ ($k_1, k_2 \in \mathbb{Z}$), a positive even number is $2k$ ($k \in \mathbb{N}$).

To prove $2k = (2k_1 + 1)^2 + (2k_2 + 1)^2$

only to make $2k = 4(k_1^2 + k_2^2 + k_1 + k_2) + 2$

i. e. $k = 2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1$

obviously the values of k_1 and k_2 here exist, so the proposition is proved.

Theorem 8: Any of positive odd numbers can be expressed as the sum of squares of three same odd numbers.

Proving: suppose an odd number is $2k + 1$, ($k \in \mathbf{Z}$ and $k \geq 0$).

To prove $2k + 1 = 3(2k_1 + 1)^2 (k_1 \in \mathbf{Z})$

only to make $2k + 1 = 12k_1^2 + 12k_1 + 3$

i. e. $2k = 12k_1^2 + 12k_1 + 2$

i. e. $k = 6k_1^2 + 6k_1 + 1$

i. e. $6k_1^2 + 6k_1 + (1 - k) = 0$

The proposition is proved.

Theorem 9: From the second number in an odd (even) natural number sequence, the new number sequence derived from the difference of squares of every number and its neighboring former number is an equal-difference number sequence in which the common difference is 8.

Proving: $a_n = (2n + 1)^2 - (2n - 1)^2 = 8n$ ($n \in \mathbf{N}$)

$a_n - a_{n-1} = 8n - 8(n - 1) = 8$ (a constant)

$b_n = (2n + 2)^2 - (2n)^2 = 8n + 4$ ($n \in \mathbf{N}$)

$b_n - b_{n-1} = (8n + 4) - [8(n - 1) + 4] = 8$ (a constant)

The proposition is proved.

Theorem 10: The difference of the square of a natural number and itself is equal to the product of itself and its neighboring smaller natural number.

Proving: suppose a natural number is n .

$$n^2 - n = n(n - 1)$$

The proposition is proved.

Theorem 11: The sum of the square of a natural number and itself is equal to the product of itself and its neighboring larger natural

number.

Proving: suppose a natural number is n . ($n \in \mathbf{N}$)

$$n^2 + n = n(n + 1)$$

The proposition is proved.

Theorem 12: The difference of squares of two neighboring natural numbers is an odd number.

Proving: suppose $n \in \mathbf{N}$

$$(n + 1)^2 - n^2 = n^2 + 2n + 1 - n^2 = 2n + 1$$

The proposition is proved.

Theorem 13: Any of odd numbers can be expressed as the difference of squares of two neighboring natural numbers.

Proving: suppose $n \in \mathbf{N}$

$$2n + 1 = n^2 - n^2 + 2n + 1 = (n + 1)^2 - n^2$$

The proposition is proved.

Theorem 14: The square of a prime number greater than 3 is an odd number.

Proving: suppose a prime number greater than 3 is p , p must be an odd number, let $p = 2n + 1$ ($n \in \mathbf{N}$ and $n > 1$)

$$p^2 = (2n + 1)^2 = 4n(n + 1) + 1$$

Because $4n(n + 1)$ is an even number, so $4n(n + 1) + 1$ is an odd number.

The proposition is proved.

Theorem 15: The cube of a prime number greater than 3 is an odd number.

Proving: suppose a prime number greater than 3 is p , p must be an odd number, let $p = 2n + 1$ ($n \in \mathbf{N}$ and $n > 1$)

$$p^3 = (2n + 1)^3 = 2n(4n^2 + 6n + 3) + 1$$

Because $2n(4n^2 + 6n + 3)$ is an even number, so $2n(4n^2 + 6n + 3) + 1$ is an odd number.

The proposition is proved.

Theorem 16: The difference of the square of a prime number greater than 3 and itself is an even number with 0, 2, 6 as its units digit.

Proving: suppose a prime number greater than 3 is p , p must be an odd number.

$$p^2 - p = p(p - 1)$$

Because $p - 1 > 0$, so $p^2 - p$ is the product of two sequential natural numbers. So it is an even natural number.

The units digit of the prime number p is 1, 3, 7, 9.

$$\text{So } (10n + 1)^2 - (10n + 1) \equiv 0 \pmod{10}$$

$$(10n + 3)^2 - (10n + 3) \equiv 6 \pmod{10}$$

$$(10n + 7)^2 - (10n + 7) \equiv 2 \pmod{10}$$

$$(10n + 9)^2 - (10n + 9) \equiv 2 \pmod{10}$$

$$n \in \mathbf{N}$$

The proposition is proved.

Theorem 17: The difference of the cube of a prime number greater than 3 and itself is an even number with 0, 4, 6 as its units digit.

Proving: suppose a prime number greater than 3 is p , p must be an odd number.

$$p^3 - p = (p - 1)p(p + 1)$$

$p^3 - p$ is the product of three sequential natural numbers,

$$\text{so } 6 \mid (p^3 - p)$$

The units digit of the prime number p is 1, 3, 7, 9.

$$\text{So } (10n + 1)^3 - (10n + 1) \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^3 - (10n + 3) \equiv 4 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^3 - (10n + 7) \equiv 6 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^3 - (10n + 9) \equiv 6 \pmod{10} \quad (n \in \mathbf{N})$$

so $p^3 - p$ is an even number with 0, 4, 6 as its units digit.

The proposition is proved.

Theorem 18: The units digit of the fourth power of a prime number greater than 7 must be 1.

Proving: suppose a prime number greater than 7 is p , p is an odd number, the units digit of an odd number must be 1, 3, 7, 9.

$$(10n + 1)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

The proposition is proved.

Theorem 19: The units digit of the fifth power of a prime number is same as the units digit of this prime number itself.

Proving: suppose a prime number is p .

When $p = 2$, $2^5 = 32$, and the units digit of 32 is 2 (itself).

When $p \neq 2$, p must be an odd number, its units digit must be 1, 3, 7, 9.

$$(10n + 1)^5 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^5 \equiv 3 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^5 \equiv 7 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^5 \equiv 9 \pmod{10} \quad (n \in \mathbf{N})$$

The proposition is proved.

Deduction 1: The sum of the fifth power of a prime number and the prime number itself is an even number.

Deduction 2: The difference of the fifth power of a prime number and the prime number itself must be a multiple of 10.

Theorem 20: The difference of the sixth power of a prime number and the prime number itself must be an even number.

Proving: suppose a prime number is p .

$$p^6 - p = p(p^5 - 1) = p(p - 1)(p^4 + p^3 + p^2 + p + 1)$$

Because $p(p-1)$ is the product of two consecutive natural numbers, then $p(p-1)$ is an even number. So $p^6 - p$ is an even number.

The proposition is proved.

Theorem 21: The difference of the sixth power of a prime number and the square of it must be a multiple of 10.

Proving: suppose a prime number is p .

When $p = 2$, $2^6 - 2^2 = 64 - 4 = 60$, the proposition is right.

When $p \neq 2$, p must be an odd number, its units digit must be 1, 3, 7, 9.

$$(10n+1)^6 - (10n+1)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+3)^6 - (10n+3)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+7)^6 - (10n+7)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+9)^6 - (10n+9)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

The proposition is proved.

Theorem 22: The difference of the cube of a prime number greater than 5 and the cube of a prime number less than it must be an even number.

Proving: suppose p_G is a prime number greater than 5 and p_L is a prime number less than 5, $p_G > p_L$. p_G and p_L are both odd numbers.

Suppose $p_G = 2k_1 + 1$, $p_L = 2k_2 + 1$ ($k_1, k_2 \in \mathbf{Z}$ and $k_1 > k_2$).

$$\begin{aligned} p_G^3 - p_L^3 &= (2k_1 + 1)^3 - (2k_2 + 1)^3 \\ &= 2(k_1 - k_2)[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3] \end{aligned}$$

Where $(k_1 - k_2) \in \mathbf{N}$, $[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3] \in \mathbf{N}$

The right part of the above equation is an even number.

The proposition is proved.

References

- 1 Sun Qi, Kuang Jinghua. Discrimination of Prime Numbers and Decomposition of Big Numbers. Shenyang: *Liaoning Education Press*, 1987
- 2 He Baoqi. Base Prime Numbers Theory. Dalian: *Dalian Press*, 1998
- 3 Pan Shuming. The Application of Mathematics and Physics in Metallurgy. Metal Mine, 1983
- 4 Chen Jingrun. Preliminary Number Theory. Beijing: *Science Press*, 1978

附录:30 万以内素数表

Appendix: List of prime numbers less than 300,000

2	107	257	421	599	769	967	1151
3	109	263	431	601	773	971	1153
5	113	269	433	607	787	977	1163
7	127	271	439	613	797	983	1171
11	131	277	443	617	809	991	1181
13	137	281	449	619	811	997	1187
17	139	283	457	631	821	1009	1193
19	149	293	461	641	823	1013	1201
23	151	307	463	643	827	1019	1213
29	157	311	467	647	829	1021	1217
31	163	313	479	653	839	1031	1223
37	167	317	487	659	853	1033	1229
41	173	331	491	661	857	1039	1231
43	179	337	499	673	859	1049	1237
47	181	347	503	677	863	1051	1249
53	191	349	509	683	877	1061	1259
59	193	353	521	691	881	1063	1277
61	197	359	523	701	883	1069	1279
67	199	367	541	709	887	1087	1283
71	211	373	547	719	907	1091	1289
73	223	379	557	727	911	1093	1291
79	227	383	563	733	919	1097	1297
83	229	389	569	739	929	1103	1301
89	233	397	571	743	937	1109	1303
97	239	401	577	751	941	1117	1307
101	241	409	587	757	947	1123	1319
103	251	419	593	761	953	1129	1321

1327	1597	1867	2113	2381	2671	2909	3217
1361	1601	1871	2129	2383	2677	2917	3221
1367	1607	1873	2131	2389	2683	2927	3229
1373	1609	1877	2137	2393	2687	2939	3251
1381	1613	1879	2141	2399	2689	2953	3253
1399	1619	1889	2143	2411	2693	2957	3257
1409	1621	1901	2153	2417	2699	2963	3259
1423	1627	1907	2161	2423	2707	2969	3271
1427	1637	1913	2179	2437	2711	2971	3299
1429	1657	1931	2203	2441	2713	2999	3301
1433	1663	1933	2207	2447	2719	3001	3307
1439	1667	1949	2213	2459	2729	3011	3313
1447	1669	1951	2221	2467	2731	3019	3319
1451	1693	1973	2237	2473	2741	3023	3323
1453	1697	1979	2239	2477	2749	3037	3329
1459	1699	1987	2243	2503	2753	3041	3331
1471	1709	1993	2251	2521	2767	3049	3343
1481	1721	1997	2267	2531	2777	3061	3347
1483	1723	1999	2269	2539	2789	3067	3359
1487	1733	2003	2273	2543	2791	3079	3361
1489	1741	2011	2281	2549	2797	3083	3371
1493	1747	2017	2287	2551	2801	3089	3373
1499	1753	2027	2293	2557	2803	3109	3389
1511	1759	2029	2297	2579	2819	3119	3391
1523	1777	2039	2309	2591	2833	3121	3407
1531	1783	2053	2311	2593	2837	3137	3413
1543	1787	2063	2333	2609	2843	3163	3433
1549	1789	2069	2339	2617	2851	3167	3449
1553	1801	2081	2341	2621	2857	3169	3457
1559	1811	2083	2347	2633	2861	3181	3461
1567	1823	2087	2351	2647	2879	3187	3463
1571	1831	2089	2357	2657	2887	3191	3467
1579	1847	2099	2371	2659	2897	3203	3469
1583	1861	2111	2377	2663	2903	3209	3491

3499	3761	4027	4327	4637	4933	5209	5503
3511	3767	4049	4337	4639	4937	5227	5507
3517	3769	4051	4339	4643	4943	5231	5519
3527	3779	4057	4349	4649	4951	5233	5521
3529	3793	4073	4357	4651	4957	5237	5527
3533	3797	4079	4363	4657	4967	5261	5531
3539	3803	4091	4373	4663	4969	5273	5557
3541	3821	4093	4391	4673	4973	5279	5563
3547	3823	4099	4397	4679	4987	5281	5569
3557	3833	4111	4409	4691	4993	5297	5573
3559	3847	4127	4421	4703	4999	5303	5581
3571	3851	4129	4423	4721	5003	5309	5591
3581	3853	4133	4441	4723	5009	5323	5623
3583	3863	4139	4447	4729	5011	5333	5639
3593	3877	4153	4451	4733	5021	5347	5641
3607	3881	4157	4457	4751	5023	5351	5647
3613	3889	4159	4463	4759	5039	5381	5651
3617	3907	4177	4481	4783	5051	5387	5653
3623	3911	4201	4483	4787	5059	5393	5657
3631	3917	4211	4493	4789	5077	5399	5659
3637	3919	4217	4507	4793	5081	5407	5669
3643	3923	4219	4513	4799	5087	5413	5683
3659	3929	4229	4517	4801	5099	5417	5689
3671	3931	4231	4519	4813	5101	5419	5693
3673	3943	4241	4523	4817	5107	5431	5701
3677	3947	4243	4547	4831	5113	5437	5711
3691	3967	4253	4549	4861	5119	5441	5717
3697	3989	4259	4561	4871	5147	5443	5737
3701	4001	4261	4567	4877	5153	5449	5741
3709	4003	4271	4583	4889	5167	5471	5743
3719	4007	4273	4591	4903	5171	5477	5749
3727	4013	4283	4597	4909	5179	5479	5779
3733	4019	4289	4603	4919	5189	5483	5783
3739	4021	4297	4621	4931	5197	5501	5791

5801	6091	6361	6691	6977	7307	7591	7907
5807	6101	6367	6701	6983	7309	7603	7919
5813	6113	6373	6703	6991	7321	7607	7927
5821	6121	6379	6709	6997	7331	7621	7933
5827	6131	6389	6719	7001	7333	7639	7937
5839	6133	6397	6733	7013	7349	7643	7949
5843	6143	6421	6737	7019	7351	7649	7951
5849	6151	6427	6761	7027	7369	7669	7963
5851	6163	6449	6763	7039	7393	7673	7993
5857	6173	6451	6779	7043	7411	7681	8009
5861	6197	6469	6781	7057	7417	7687	8011
5867	6199	6473	6791	7069	7433	7691	8017
5869	6203	6481	6793	7079	7451	7699	8039
5879	6211	6491	6803	7103	7457	7703	8053
5881	6217	6521	6823	7109	7459	7717	8059
5897	6221	6529	6827	7121	7477	7723	8069
5903	6229	6547	6829	7127	7481	7727	8081
5923	6247	6551	6833	7129	7487	7741	8087
5927	6257	6553	6841	7151	7489	7753	8089
5939	6263	6563	6857	7159	7499	7757	8093
5953	6269	6569	6863	7177	7507	7759	8101
5981	6271	6571	6869	7187	7517	7789	8111
5987	6277	6577	6871	7193	7523	7793	8117
6007	6287	6581	6883	7207	7529	7817	8123
6011	6299	6599	6899	7211	7537	7823	8147
6029	6301	6607	6907	7213	7541	7829	8161
6037	6311	6619	6911	7219	7547	7841	8167
6043	6317	6637	6917	7229	7549	7853	8171
6047	6323	6653	6947	7237	7559	7867	8179
6053	6329	6659	6949	7243	7561	7873	8191
6067	6337	6661	6959	7247	7573	7877	8209
6073	6343	6673	6961	7253	7577	7879	8219
6079	6353	6679	6967	7283	7583	7883	8221
6089	6359	6689	6971	7297	7589	7901	8231

8233	8563	8837	9157	9437	9749	10079	10357
8237	8573	8839	9161	9439	9767	10091	10369
8243	8581	8849	9173	9461	9769	10093	10391
8263	8597	8861	9181	9463	9781	10099	10399
8269	8599	8863	9187	9467	9787	10103	10427
8273	8609	8867	9199	9473	9791	10111	10429
8287	8623	8887	9203	9479	9803	10133	10433
8291	8627	8893	9209	9491	9811	10139	10453
8293	8629	8923	9221	9497	9817	10141	10457
8297	8641	8929	9227	9511	9829	10151	10459
8311	8647	8933	9239	9521	9833	10159	10463
8317	8663	8941	9241	9533	9839	10163	10477
8329	8669	8951	9257	9539	9851	10169	10487
8353	8677	8963	9277	9547	9857	10177	10499
8363	8681	8969	9281	9551	9859	10181	10501
8369	8689	8971	9283	9587	9871	10193	10513
8377	8693	8999	9293	9601	9883	10211	10529
8387	8699	9001	9311	9613	9887	10223	10531
8389	8707	9007	9319	9619	9901	10243	10559
8419	8713	9011	9323	9623	9907	10247	10567
8423	8719	9013	9337	9629	9923	10253	10589
8429	8731	9029	9341	9631	9929	10259	10597
8431	8737	9041	9343	9643	9931	10267	10601
8443	8741	9043	9349	9649	9941	10271	10607
8447	8747	9049	9371	9661	9949	10273	10613
8461	8753	9059	9377	9677	9967	10289	10627
8467	8761	9067	9391	9679	9973	10301	10631
8501	8779	9091	9397	9689	10007	10303	10639
8513	8783	9103	9403	9697	10009	10313	10651
8521	8803	9109	9413	9719	10037	10321	10657
8527	8807	9127	9419	9721	10039	10331	10663
8537	8819	9133	9421	9733	10061	10333	10667
8539	8821	9137	9431	9739	10067	10337	10687
8543	8831	9151	9433	9743	10069	10343	10691

10709	11057	11369	11719	12037	12347	12637	12959
10711	11059	11383	11731	12041	12373	12641	12967
10723	11069	11393	11743	12043	12377	12647	12973
10729	11071	11399	11777	12049	12379	12653	12979
10733	11083	11411	11779	12071	12391	12659	12983
10739	11087	11423	11783	12073	12401	12671	13001
10753	11093	11437	11789	12097	12409	12689	13003
10771	11113	11443	11801	12101	12413	12697	13007
10781	11117	11447	11807	12107	12421	12703	13009
10789	11119	11467	11813	12109	12433	12713	13033
10799	11131	11471	11821	12113	12437	12721	13037
10831	11149	11483	11827	12119	12451	12739	13043
10837	11159	11489	11831	12143	12457	12743	13049
10847	11161	11491	11833	12149	12473	12757	13063
10853	11171	11497	11839	12157	12479	12763	13093
10859	11173	11503	11863	12161	12487	12781	13099
10861	11177	11519	11867	12163	12491	12791	13103
10867	11197	11527	11887	12197	12497	12799	13109
10883	11213	11549	11897	12203	12503	12809	13121
10889	11239	11551	11903	12211	12511	12821	13127
10891	11243	11579	11909	12227	12517	12823	13147
10903	11251	11587	11923	12239	12527	12829	13151
10909	11257	11593	11927	12241	12539	12841	13159
10937	11261	11597	11933	12251	12541	12853	13163
10939	11273	11617	11939	12253	12547	12889	13171
10949	11279	11621	11941	12263	12553	12893	13177
10957	11287	11633	11953	12269	12569	12899	13183
10973	11299	11657	11959	12277	12577	12907	13187
10979	11311	11677	11969	12281	12583	12911	13217
10987	11317	11681	11971	12289	12589	12917	13219
10993	11321	11689	11981	12301	12601	12919	13229
11003	11329	11699	11987	12323	12611	12923	13241
11027	11351	11701	12007	12329	12613	12941	13249
11047	11353	11717	12011	12343	12619	12953	13259

13267	13627	13913	14321	14629	14923	15263	15559
13291	13633	13921	14323	14633	14929	15269	15569
13297	13649	13931	14327	14639	14939	15271	15581
13309	13669	13933	14341	14653	14947	15277	15583
13313	13679	13963	14347	14657	14951	15287	15601
13327	13681	13967	14369	14669	14957	15289	15607
13331	13687	13997	14387	14683	14969	15299	15619
13337	13691	13999	14389	14699	14983	15307	15629
13339	13693	14009	14401	14713	15013	15313	15641
13367	13697	14011	14407	14717	15017	15319	15643
13381	13709	14029	14411	14723	15031	15329	15647
13397	13711	14033	14419	14731	15053	15331	15649
13399	13721	14051	14423	14737	15061	15349	15661
13411	13723	14057	14431	14741	15073	15359	15667
13417	13729	14071	14437	14747	15077	15361	15671
13421	13751	14081	14447	14753	15083	15373	15679
13441	13757	14083	14449	14759	15091	15377	15683
13451	13759	14087	14461	14767	15101	15383	15727
13457	13763	14107	14479	14771	15107	15391	15731
13463	13781	14143	14489	14779	15121	15401	15733
13469	13789	14149	14503	14783	15131	15413	15737
13477	13799	14153	14519	14797	15137	15427	15739
13487	13807	14159	14533	14813	15139	15439	15749
13499	13829	14173	14537	14821	15149	15443	15761
13513	13831	14177	14543	14827	15161	15451	15767
13523	13841	14197	14549	14831	15173	15461	15773
13537	13859	14207	14551	14843	15187	15467	15787
13553	13873	14221	14557	14851	15193	15473	15791
13567	13877	14243	14561	14867	15199	15493	15797
13577	13879	14249	14563	14869	15217	15497	15803
13591	13883	14251	14591	14879	15227	15511	15809
13597	13901	14281	14593	14887	15233	15527	15817
13613	13903	14293	14621	14891	15241	15541	15823
13619	13907	14303	14627	14897	15259	15551	15859

15877	16193	16561	16921	17239	17569	17911	18217
15881	16217	16567	16927	17257	17573	17921	18223
15887	16223	16573	16931	17291	17579	17923	18229
15889	16229	16603	16937	17293	17581	17929	18233
15901	16231	16607	16943	17299	17597	17939	18251
15907	16249	16619	16963	17317	17599	17957	18253
15913	16253	16631	16979	17321	17609	17959	18257
15919	16267	16633	16981	17327	17623	17971	18269
15923	16273	16649	16987	17333	17627	17977	18287
15937	16301	16651	16993	17341	17657	17981	18289
15959	16319	16657	17011	17351	17659	17987	18301
15971	16333	16661	17021	17359	17669	17989	18307
15973	16339	16673	17027	17377	17681	18013	18311
15991	16349	16691	17029	17383	17683	18041	18313
16001	16361	16693	17033	17387	17707	18043	18329
16007	16363	16699	17041	17389	17713	18047	18341
16033	16369	16703	17047	17393	17729	18049	18353
16057	16381	16729	17053	17401	17737	18059	18367
16061	16411	16741	17077	17417	17747	18061	18371
16063	16417	16747	17093	17419	17749	18077	18379
16067	16421	16759	17099	17431	17761	18089	18397
16069	16427	16763	17107	17443	17783	18097	18401
16073	16433	16787	17117	17449	17789	18119	18413
16087	16447	16811	17123	17467	17791	18121	18427
16091	16451	16823	17137	17471	17807	18127	18433
16097	16453	16829	17159	17477	17827	18131	18439
16103	16477	16831	17167	17483	17837	18133	18443
16111	16481	16843	17183	17489	17839	18143	18451
16127	16487	16871	17189	17491	17851	18149	18457
16139	16493	16879	17191	17497	17863	18169	18461
16141	16519	16883	17203	17509	17881	18181	18481
16183	16529	16889	17207	17519	17891	18191	18493
16187	16547	16901	17209	17539	17903	18199	18503
16189	16553	16903	17231	17551	17909	18211	18517

18521	18947	19309	19597	19963	20269	20627	20981
18523	18959	19319	19603	19973	20287	20639	20983
18539	18973	19333	19609	19979	20297	20641	21001
18541	18979	19373	19661	19991	20323	20663	21011
18553	19001	19379	19681	19993	20327	20681	21013
18583	19009	19381	19687	19997	20333	20693	21017
18587	19013	19387	19697	20011	20341	20707	21019
18593	19031	19391	19699	20021	20347	20717	21023
18617	19037	19403	19709	20023	20353	20719	21031
18637	19051	19417	19717	20029	20357	20731	21059
18661	19069	19421	19727	20047	20359	20743	21061
18671	19073	19423	19739	20051	20369	20747	21067
18679	19079	19427	19751	20063	20389	20749	21089
18691	19081	19429	19753	20071	20393	20753	21101
18701	19087	19433	19759	20089	20399	20759	21107
18713	19121	19441	19763	20101	20407	20771	21121
18719	19139	19447	19777	20107	20411	20773	21139
18731	19141	19457	19793	20113	20431	20789	21143
18743	19157	19463	19801	20117	20441	20807	21149
18749	19163	19469	19813	20123	20443	20809	21157
18757	19181	19471	19819	20129	20477	20849	21163
18773	19183	19477	19841	20143	20479	20857	21169
18787	19207	19483	19843	20147	20483	20873	21179
18793	19211	19489	19853	20149	20507	20879	21187
18797	19213	19501	19861	20161	20509	20887	21191
18803	19219	19507	19867	20173	20521	20897	21193
18839	19231	19531	19889	20177	20533	20899	21211
18859	19237	19541	19891	20183	20543	20903	21221
18869	19249	19543	19913	20201	20549	20921	21227
18899	19259	19553	19919	20219	20551	20929	21247
18911	19267	19559	19927	20231	20563	20939	21269
18913	19273	19571	19937	20233	20593	20947	21277
18917	19289	19577	19949	20249	20599	20959	21283
18919	19301	19583	19961	20261	20611	20963	21313

21317	21611	21961	22277	22639	22973	23293	23633
21319	21613	21977	22279	22643	22993	23297	23663
21323	21617	21991	22283	22651	23003	23311	23669
21341	21647	21997	22291	22669	23011	23321	23671
21347	21649	22003	22303	22679	23017	23327	23677
21377	21661	22013	22307	22691	23021	23333	23687
21379	21673	22027	22343	22697	23027	23339	23689
21383	21683	22031	22349	22699	23029	23357	23719
21391	21701	22037	22367	22709	23039	23369	23741
21397	21713	22039	22369	22717	23041	23371	23743
21401	21727	22051	22381	22721	23053	23399	23747
21407	21737	22063	22391	22727	23057	23417	23753
21419	21739	22067	22397	22739	23059	23431	23761
21433	21751	22073	22409	22741	23063	23447	23767
21467	21757	22079	22433	22751	23071	23459	23773
21481	21767	22091	22441	22769	23081	23473	23789
21487	21773	22093	22447	22777	23087	23497	23801
21491	21787	22109	22453	22783	23099	23509	23813
21493	21799	22111	22469	22787	23117	23531	23819
21499	21803	22123	22481	22807	23131	23537	23827
21503	21817	22129	22483	22811	23143	23539	23831
21517	21821	22133	22501	22817	23159	23549	23833
21521	21839	22147	22511	22853	23167	23557	23857
21523	21841	22153	22531	22859	23173	23561	23869
21529	21851	22157	22541	22861	23189	23563	23873
21557	21859	22159	22543	22871	23197	23567	23879
21559	21863	22171	22549	22877	23201	23581	23887
21563	21871	22189	22567	22901	23203	23593	23893
21569	21881	22193	22571	22907	23209	23599	23899
21577	21893	22229	22573	22921	23227	23603	23909
21587	21911	22247	22613	22937	23251	23609	23911
21589	21929	22259	22619	22943	23269	23623	23917
21599	21937	22271	22621	22961	23279	23627	23929
21601	21943	22273	22637	22963	23291	23629	23957

23971	24251	24683	25057	25409	25747	26107	26423
23977	24281	24691	25073	25411	25759	26111	26431
23981	24317	24697	25087	25423	25763	26113	26437
23993	24329	24709	25097	25439	25771	26119	26449
24001	24337	24733	25111	25447	25793	26141	26459
24007	24359	24749	25117	25453	25799	26153	26479
24019	24371	24763	25121	25457	25801	26161	26489
24023	24373	24767	25127	25463	25819	26171	26497
24029	24379	24781	25147	25469	25841	26177	26501
24043	24391	24793	25153	25471	25847	26183	26513
24049	24407	24799	25163	25523	25849	26189	26539
24061	24413	24809	25169	25537	25867	26203	26557
24071	24419	24821	25171	25541	25873	26209	26561
24077	24421	24841	25183	25561	25889	26227	26573
24083	24439	24847	25189	25577	25903	26237	26591
24091	24443	24851	25219	25579	25913	26249	26597
24097	24469	24859	25229	25583	25919	26251	26627
24103	24473	24877	25237	25589	25931	26261	26633
24107	24481	24889	25243	25601	25933	26263	26641
24109	24499	24907	25247	25603	25939	26267	26647
24113	24509	24917	25253	25609	25943	26293	26669
24121	24517	24919	25261	25621	25951	26297	26681
24133	24527	24923	25301	25633	25969	26309	26683
24137	24533	24943	25303	25639	25981	26317	26687
24151	24547	24953	25307	25643	25997	26321	26693
24169	24551	24967	25309	25657	25999	26339	26699
24179	24571	24971	25321	25667	26003	26347	26701
24181	24593	24977	25339	25673	26017	26357	26711
24197	24611	24979	25343	25679	26021	26371	26713
24203	24623	24989	25349	25693	26029	26387	26717
24223	24631	25013	25357	25703	26041	26393	26723
24229	24659	25031	25367	25717	26053	26399	26729
24239	24671	25033	25373	25733	26083	26407	26731
24247	24677	25037	25391	25741	26099	26417	26737

26759	27091	27509	27823	28183	28559	28843	29207
26777	27103	27527	27827	28201	28571	28859	29209
26783	27107	27529	27847	28211	28573	28867	29221
26801	27109	27539	27851	28219	28579	28871	29231
26813	27127	27541	27883	28229	28591	28879	29243
26821	27143	27551	27893	28277	28597	28901	29251
26833	27179	27581	27901	28279	28603	28909	29269
26839	27191	27583	27917	28283	28607	28921	29287
26849	27197	27611	27919	28289	28619	28927	29297
26861	27211	27617	27941	28297	28621	28933	29303
26863	27239	27631	27943	28307	28627	28949	29311
26879	27241	27647	27947	28309	28631	28961	29327
26881	27253	27653	27953	28319	28643	28979	29333
26891	27259	27673	27961	28349	28649	29009	29339
26893	27271	27689	27967	28351	28657	29017	29347
26903	27277	27691	27983	28387	28661	29021	29363
26921	27281	27697	27997	28393	28663	29023	29383
26927	27283	27701	28001	28403	28669	29027	29387
26947	27299	27733	28019	28409	28687	29033	29389
26951	27329	27737	28027	28411	28697	29059	29399
26953	27337	27739	28031	28429	28703	29063	29401
26959	27361	27743	28051	28433	28711	29077	29411
26981	27367	27749	28057	28439	28723	29101	29423
26987	27397	27751	28069	28447	28729	29123	29429
26993	27407	27763	28081	28463	28751	29129	29437
27011	27409	27767	28087	28477	28753	29131	29443
27017	27427	27773	28097	28493	28759	29137	29453
27031	27431	27779	28099	28499	28771	29147	29473
27043	27437	27791	28109	28513	28789	29153	29483
27059	27449	27793	28111	28517	28793	29167	29501
27061	27457	27799	28123	28537	28807	29173	29527
27067	27479	27803	28151	28541	28813	29179	29531
27073	27481	27809	28163	28547	28817	29191	29537
27077	27487	27817	28181	28549	28837	29201	29567

29569	29959	30313	30697	31051	31337	31729	32119
29573	29983	30319	30703	31063	31357	31741	32141
29581	29989	30323	30707	31069	31379	31751	32143
29587	30011	30341	30713	31079	31387	31769	32159
29599	30013	30347	30727	31081	31391	31771	32173
29611	30029	30367	30757	31091	31393	31793	32183
29629	30047	30389	30763	31121	31397	31799	32189
29633	30059	30391	30773	31123	31469	31817	32191
29641	30071	30403	30781	31139	31477	31847	32203
29663	30089	30427	30803	31147	31481	31849	32213
29669	30091	30431	30809	31151	31489	31859	32233
29671	30097	30449	30817	31153	31511	31873	32237
29683	30103	30467	30829	31159	31513	31883	32251
29717	30109	30469	30839	31177	31517	31891	32257
29723	30113	30491	30841	31181	31531	31907	32261
29741	30119	30493	30851	31183	31541	31957	32297
29753	30133	30497	30853	31189	31543	31963	32299
29759	30137	30509	30859	31193	31547	31973	32303
29761	30139	30517	30869	31219	31567	31981	32309
29789	30161	30529	30871	31223	31573	31991	32321
29803	30169	30539	30881	31231	31583	32003	32323
29819	30181	30553	30893	31237	31601	32009	32327
29833	30187	30557	30911	31247	31607	32027	32341
29837	30197	30559	30931	31249	31627	32029	32353
29851	30203	30577	30937	31253	31643	32051	32359
29863	30211	30593	30941	31259	31649	32057	32363
29867	30223	30631	30949	31267	31657	32059	32369
29873	30241	30637	30971	31271	31663	32063	32371
29879	30253	30643	30977	31277	31667	32069	32377
29881	30259	30649	30983	31307	31687	32077	32381
29917	30269	30661	31013	31319	31699	32083	32401
29921	30271	30671	31019	31321	31721	32089	32411
29927	30293	30677	31033	31327	31723	32099	32413
29947	30307	30689	31039	31333	31727	32117	32423

32429	32783	33107	33469	33769	34159	34499	34843
32441	32789	33113	33479	33773	34171	34501	34847
32443	32797	33119	33487	33791	34183	34511	34849
32467	32801	33149	33493	33797	34211	34513	34871
32479	32803	33151	33503	33809	34213	34519	34877
32491	32831	33161	33521	33811	34217	34537	34883
32497	32833	33179	33529	33827	34231	34543	34897
32503	32839	33181	33533	33829	34253	34549	34913
32507	32843	33191	33547	33851	34259	34583	34919
32531	32869	33199	33563	33857	34261	34589	34939
32533	32887	33203	33569	33863	34267	34591	34949
32537	32909	33211	33577	33871	34273	34603	34961
32561	32911	33223	33581	33889	34283	34607	34963
32563	32917	33247	33587	33893	34297	34613	34981
32569	32933	33287	33589	33911	34301	34631	35023
32573	32939	33289	33599	33923	34303	34649	35027
32579	32941	33301	33601	33931	34313	34651	35051
32587	32957	33311	33613	33937	34319	34667	35053
32603	32969	33317	33617	33941	34327	34673	35059
32609	32971	33329	33619	33961	34337	34679	35069
32611	32983	33331	33623	33967	34351	34687	35081
32621	32987	33343	33629	33997	34361	34693	35083
32633	32993	33347	33637	34019	34367	34703	35089
32647	32999	33349	33641	34031	34369	34721	35099
32653	33013	33353	33647	34033	34381	34729	35107
32687	33023	33359	33679	34039	34403	34739	35111
32693	33029	33377	33703	34057	34421	34747	35117
32707	33037	33391	33713	34061	34429	34757	35129
32713	33049	33403	33721	34123	34439	34759	35141
32717	33053	33409	33739	34127	34457	34763	35149
32719	33071	33413	33749	34129	34469	34781	35153
32749	33073	33427	33751	34141	34471	34807	35159
32771	33083	33457	33757	34147	34483	34819	35171
32779	33091	33461	33767	34157	34487	34841	35201

35221	35569	35977	36319	36683	36997	37363	37691
35227	35573	35983	36341	36691	37003	37369	37693
35251	35591	35993	36343	36697	37013	37379	37699
35257	35593	35999	36353	36709	37019	37397	37717
35267	35597	36007	36373	36713	37021	37409	37747
35279	35603	36011	36383	36721	37039	37423	37781
35281	35617	36013	36389	36739	37049	37441	37783
35291	35671	36017	36433	36749	37057	37447	37799
35311	35677	36037	36451	36761	37061	37463	37811
35317	35729	36061	36457	36767	37087	37483	37813
35323	35731	36067	36467	36779	37097	37489	37831
35327	35747	36073	36469	36781	37117	37493	37847
35339	35753	36083	36473	36787	37123	37501	37853
35353	35759	36097	36479	36791	37139	37507	37861
35363	35771	36107	36493	36793	37159	37511	37871
35381	35797	36109	36497	36809	37171	37517	37879
35393	35801	36131	36523	36821	37181	37529	37889
35401	35803	36137	36527	36833	37189	37537	37897
35407	35809	36151	36529	36847	37199	37547	37907
35419	35831	36161	36541	36857	37201	37549	37951
35423	35837	36187	36551	36871	37217	37561	37957
35437	35839	36191	36559	36877	37223	37567	37963
35447	35851	36209	36563	36887	37243	37571	37967
35449	35863	36217	36571	36899	37253	37573	37987
35461	35869	36229	36583	36901	37273	37579	37991
35491	35879	36241	36587	36913	37277	37589	37993
35507	35897	36251	36599	36919	37307	37591	37997
35509	35899	36263	36607	36923	37309	37607	38011
35521	35911	36269	36629	36929	37313	37619	38039
35527	35923	36277	36637	36931	37321	37633	38047
35531	35933	36293	36643	36943	37337	37643	38053
35533	35951	36299	36653	36947	37339	37649	38069
35537	35963	36307	36671	36973	37357	37657	38083
35543	35969	36313	36677	36979	37361	37663	38113

38119	38501	38851	39199	39551	39887	40277	40699
38149	38543	38861	39209	39563	39901	40283	40709
38153	38557	38867	39217	39569	39929	40289	40739
38167	38561	38873	39227	39581	39937	40343	40751
38177	38567	38891	39229	39607	39953	40351	40759
38183	38569	38903	39233	39619	39971	40357	40763
38189	38593	38917	39239	39623	39979	40361	40771
38197	38603	38921	39241	39631	39983	40387	40787
38201	38609	38923	39251	39659	39989	40423	40801
38219	38611	38933	39293	39667	40009	40427	40813
38231	38629	38953	39301	39671	40013	40429	40819
38237	38639	38959	39313	39679	40031	40433	40823
38239	38651	38971	39317	39703	40037	40459	40829
38261	38653	38977	39323	39709	40039	40471	40841
38273	38669	38993	39341	39719	40063	40483	40847
38281	38671	39019	39343	39727	40087	40487	40849
38287	38677	39023	39359	39733	40093	40493	40853
38299	38693	39041	39367	39749	40099	40499	40867
38303	38699	39043	39371	39761	40111	40507	40879
38317	38707	39047	39373	39769	40123	40519	40883
38321	38711	39079	39383	39779	40127	40529	40897
38327	38713	39089	39397	39791	40129	40531	40903
38329	38723	39097	39409	39799	40151	40543	40927
38333	38729	39103	39419	39821	40153	40559	40933
38351	38737	39107	39439	39827	40163	40577	40939
38371	38747	39113	39443	39829	40169	40583	40949
38377	38749	39119	39451	39839	40177	40591	40961
38393	38767	39133	39461	39841	40189	40597	40973
38431	38783	39139	39499	39847	40193	40609	40993
38447	38791	39157	39503	39857	40213	40627	41011
38449	38803	39161	39509	39863	40231	40637	41017
38453	38821	39163	39511	39869	40237	40639	41023
38459	38833	39181	39521	39877	40241	40693	41039
38461	38839	39191	39541	39883	40253	40697	41047

41051	41389	41737	42071	42403	42719	43063	43517
41057	41399	41759	42073	42407	42727	43067	43541
41077	41411	41761	42083	42409	42737	43093	43543
41081	41413	41771	42089	42433	42743	43103	43573
41113	41443	41777	42101	42437	42751	43117	43577
41117	41453	41801	42131	42443	42767	43133	43579
41131	41467	41809	42139	42451	42773	43151	43591
41141	41479	41813	42157	42457	42787	43159	43597
41143	41491	41843	42169	42461	42793	43177	43607
41149	41507	41849	42179	42463	42797	43189	43609
41161	41513	41851	42181	42467	42821	43201	43613
41177	41519	41863	42187	42473	42829	43207	43627
41179	41521	41879	42193	42487	42839	43223	43633
41183	41539	41887	42197	42491	42841	43237	43649
41189	41543	41893	42209	42499	42853	43261	43651
41201	41549	41897	42221	42509	42859	43271	43661
41203	41579	41903	42223	42533	42863	43283	43669
41213	41593	41911	42227	42557	42899	43291	43691
41221	41597	41927	42239	42569	42901	43313	43711
41227	41603	41941	42257	42571	42923	43319	43717
41231	41609	41947	42281	42577	42929	43321	43721
41233	41611	41953	42283	42589	42937	43331	43753
41243	41617	41957	42293	42611	42943	43391	43759
41257	41621	41959	42299	42641	42953	43397	43777
41263	41627	41969	42307	42643	42961	43399	43781
41269	41641	41981	42323	42649	42967	43403	43783
41281	41647	41983	42331	42667	42979	43411	43787
41299	41651	41999	42337	42677	42989	43427	43789
41333	41659	42013	42349	42683	43003	43441	43793
41341	41669	42017	42359	42689	43013	43451	43801
41351	41681	42019	42373	42697	43019	43457	43853
41357	41687	42023	42379	42701	43037	43481	43867
41381	41719	42043	42391	42703	43049	43487	43889
41387	41729	42061	42397	42709	43051	43499	43891

43913	44221	44621	44959	45341	45751	46141	46507
43933	44249	44623	44963	45343	45757	46147	46511
43943	44257	44633	44971	45361	45763	46153	46523
43951	44263	44641	44983	45377	45767	46171	46549
43961	44267	44647	44987	45389	45779	46181	46559
43963	44269	44651	45007	45403	45817	46183	46567
43969	44273	44657	45013	45413	45821	46187	46573
43973	44279	44683	45053	45427	45823	46199	46589
43987	44281	44687	45061	45433	45827	46219	46591
43991	44293	44699	45077	45439	45833	46229	46601
43997	44351	44701	45083	45481	45841	46237	46619
44017	44357	44711	45119	45491	45853	46261	46633
44021	44371	44729	45121	45497	45863	46271	46639
44027	44381	44741	45127	45503	45869	46273	46643
44029	44383	44753	45131	45523	45887	46279	46649
44041	44389	44771	45137	45533	45893	46301	46663
44053	44417	44773	45139	45541	45943	46307	46679
44059	44449	44777	45161	45553	45949	46309	46681
44071	44453	44789	45179	45557	45953	46327	46687
44087	44483	44797	45181	45569	45959	46337	46691
44089	44491	44809	45191	45587	45971	46349	46703
44101	44497	44819	45197	45589	45979	46351	46723
44111	44501	44839	45233	45599	45989	46381	46727
44119	44507	44843	45247	45613	46021	46399	46747
44123	44519	44851	45259	45631	46027	46411	46751
44129	44531	44867	45263	45641	46049	46439	46757
44131	44533	44879	45281	45659	46051	46441	46769
44159	44537	44887	45289	45667	46061	46447	46771
44171	44543	44893	45293	45673	46073	46451	46807
44179	44549	44909	45307	45677	46091	46457	46811
44189	44563	44917	45317	45691	46093	46471	46817
44201	44579	44927	45319	45697	46099	46477	46819
44203	44587	44939	45329	45707	46103	46489	46829
44207	44617	44953	45337	45737	46133	46499	46831

46853	47287	47623	47963	48383	48751	49081	49429
46861	47293	47629	47969	48397	48757	49103	49433
46867	47297	47639	47977	48407	48761	49109	49451
46877	47303	47653	47981	48409	48767	49117	49459
46889	47309	47657	48017	48413	48779	49121	49463
46901	47317	47659	48023	48437	48781	49123	49477
46919	47339	47681	48029	48449	48787	49139	49481
46933	47351	47699	48049	48463	48799	49157	49499
46957	47353	47701	48073	48473	48809	49169	49523
46993	47363	47711	48079	48479	48817	49171	49529
46997	47381	47713	48091	48481	48821	49177	49531
47017	47387	47717	48109	48487	48823	49193	49537
47041	47389	47737	48119	48491	48847	49199	49547
47051	47407	47741	48121	48497	48857	49201	49549
47057	47417	47743	48131	48523	48859	49207	49559
47059	47419	47777	48157	48527	48869	49211	49597
47087	47431	47779	48163	48533	48871	49223	49603
47093	47441	47791	48179	48539	48883	49253	49613
47111	47459	47797	48187	48541	48889	49261	49627
47119	47491	47807	48193	48563	48907	49277	49633
47123	47497	47809	48197	48571	48947	49279	49639
47129	47501	47819	48221	48589	48953	49297	49663
47137	47507	47837	48239	48593	48973	49307	49667
47143	47513	47843	48247	48611	48989	49331	49669
47147	47521	47857	48259	48619	48991	49333	49681
47149	47527	47869	48271	48623	49003	49339	49697
47161	47533	47881	48281	48647	49009	49363	49711
47189	47543	47903	48299	48649	49019	49367	49727
47207	47563	47911	48311	48661	49031	49369	49739
47221	47569	47917	48313	48673	49033	49391	49741
47237	47581	47933	48337	48677	49037	49393	49747
47251	47591	47939	48341	48679	49043	49409	49757
47269	47599	47947	48353	48731	49057	49411	49783
47279	47609	47951	48371	48733	49069	49417	49787

49789	50123	50513	50923	51307	51613	51973	52363
49801	50129	50527	50929	51329	51631	51977	52369
49807	50131	50539	50951	51341	51637	51991	52379
49811	50147	50543	50957	51343	51647	52009	52387
49823	50153	50549	50969	51347	51659	52021	52391
49831	50159	50551	50971	51349	51673	52027	52433
49843	50177	50581	50989	51361	51679	52051	52453
49853	50207	50587	50993	51383	51683	52057	52457
49871	50221	50591	51001	51407	51691	52067	52489
49877	50227	50593	51031	51413	51713	52069	52501
49891	50231	50599	51043	51419	51719	52081	52511
49919	50261	50627	51047	51421	51721	52103	52517
49921	50263	50647	51059	51427	51749	52121	52529
49927	50273	50651	51061	51431	51767	52127	52541
49937	50287	50671	51071	51437	51769	52147	52543
49939	50291	50683	51109	51439	51787	52153	52553
49943	50311	50707	51131	51449	51797	52163	52561
49957	50321	50723	51133	51461	51803	52177	52567
49991	50329	50741	51137	51473	51817	52181	52571
49993	50333	50753	51151	51479	51827	52183	52579
49999	50341	50767	51157	51481	51829	52189	52583
50021	50359	50773	51169	51487	51839	52201	52609
50023	50363	50777	51193	51503	51853	52223	52627
50033	50377	50789	51197	51511	51859	52237	52631
50047	50383	50821	51199	51517	51869	52249	52639
50051	50387	50833	51203	51521	51871	52253	52667
50053	50411	50839	51217	51539	51893	52259	52673
50069	50417	50849	51229	51551	51899	52267	52691
50077	50423	50857	51239	51563	51907	52289	52697
50087	50441	50867	51241	51577	51913	52291	52709
50093	50459	50873	51257	51581	51929	52301	52711
50101	50461	50891	51263	51593	51941	52313	52721
50111	50497	50893	51283	51599	51949	52321	52727
50119	50503	50909	51287	51607	51971	52361	52733

52747	53113	53503	53861	54277	54581	54979	55351
52757	53117	53507	53881	54287	54583	54983	55373
52769	53129	53527	53887	54293	54601	55001	55381
52783	53147	53549	53891	54311	54617	55009	55399
52807	53149	53551	53897	54319	54623	55021	55411
52813	53161	53569	53899	54323	54629	55049	55439
52817	53171	53591	53917	54331	54631	55051	55441
52837	53173	53593	53923	54347	54647	55057	55457
52859	53189	53597	53927	54361	54667	55061	55469
52861	53197	53609	53939	54367	54673	55073	55487
52879	53201	53611	53951	54371	54679	55079	55501
52883	53231	53617	53959	54377	54709	55103	55511
52889	53233	53623	53987	54401	54713	55109	55529
52901	53239	53629	53993	54403	54721	55117	55541
52903	53267	53633	54001	54409	54727	55127	55547
52919	53269	53639	54011	54413	54751	55147	55579
52937	53279	53653	54013	54419	54767	55163	55589
52951	53281	53657	54037	54421	54773	55171	55603
52957	53299	53681	54049	54437	54779	55201	55609
52963	53309	53693	54059	54443	54787	55207	55619
52967	53323	53699	54083	54449	54799	55213	55621
52973	53327	53717	54091	54469	54829	55217	55631
52981	53353	53719	54101	54493	54833	55219	55633
52999	53359	53731	54121	54497	54851	55229	55639
53003	53377	53759	54133	54499	54869	55243	55661
53017	53381	53773	54139	54503	54877	55249	55663
53047	53401	53777	54151	54517	54881	55259	55667
53051	53407	53783	54163	54521	54907	55291	55673
53069	53411	53791	54167	54539	54917	55313	55681
53077	53419	53813	54181	54541	54919	55331	55691
53087	53437	53819	54193	54547	54941	55333	55697
53089	53441	53831	54217	54559	54949	55337	55711
53093	53453	53849	54251	54563	54959	55339	55717
53101	53479	53857	54269	54577	54973	55343	55721

55733	56093	56473	56807	57131	57493	57847	58207
55763	56099	56477	56809	57139	57503	57853	58211
55787	56101	56479	56813	57143	57527	57859	58217
55793	56113	56489	56821	57149	57529	57881	58229
55799	56123	56501	56827	57163	57557	57899	58231
55807	56131	56503	56843	57173	57559	57901	58237
55813	56149	56509	56857	57179	57571	57917	58243
55817	56167	56519	56873	57191	57587	57923	58271
55819	56171	56527	56891	57193	57593	57943	58309
55823	56179	56531	56893	57203	57601	57947	58313
55829	56197	56533	56897	57221	57637	57973	58321
55837	56207	56543	56909	57223	57641	57977	58337
55843	56209	56569	56911	57241	57649	57991	58363
55849	56237	56591	56921	57251	57653	58013	58367
55871	56239	56597	56923	57259	57667	58027	58369
55889	56249	56599	56929	57269	57679	58031	58379
55897	56263	56611	56941	57271	57689	58043	58391
55901	56267	56629	56951	57283	57697	58049	58393
55903	56269	56633	56957	57287	57709	58057	58403
55921	56299	56659	56963	57301	57713	58061	58411
55927	56311	56663	56983	57329	57719	58067	58417
55931	56333	56671	56989	57331	57727	58073	58427
55933	56359	56681	56993	57347	57731	58099	58439
55949	56369	56687	56999	57349	57737	58109	58441
55967	56377	56701	57037	57367	57751	58111	58451
55987	56383	56711	57041	57373	57773	58129	58453
55997	56393	56713	57047	57383	57781	58147	58477
56003	56401	56731	57059	57389	57787	58151	58481
56009	56417	56737	57073	57397	57791	58153	58511
56039	56431	56747	57077	57413	57793	58169	58537
56041	56437	56767	57089	57427	57803	58171	58543
56053	56443	56773	57097	57457	57809	58189	58549
56081	56453	56779	57107	57467	57829	58193	58567
56087	56467	56783	57119	57487	57839	58199	58573

58579	58997	59341	59663	60089	60493	60869	61291
58601	59009	59351	59669	60091	60497	60887	61297
58603	59011	59357	59671	60101	60509	60889	61331
58613	59021	59359	59693	60103	60521	60899	61333
58631	59023	59369	59699	60107	60527	60901	61339
58657	59029	59377	59707	60127	60539	60913	61343
58661	59051	59387	59723	60133	60589	60917	61357
58679	59053	59393	59729	60139	60601	60919	61363
58687	59063	59399	59743	60149	60607	60923	61379
58693	59069	59407	59747	60161	60611	60937	61381
58699	59077	59417	59753	60167	60617	60943	61403
58711	59083	59419	59771	60169	60623	60953	61409
58727	59093	59441	59779	60209	60631	60961	61417
58733	59107	59443	59791	60217	60637	61001	61441
58741	59113	59447	59797	60223	60647	61007	61463
58757	59119	59453	59809	60251	60649	61027	61469
58763	59123	59467	59833	60257	60659	61031	61471
58771	59141	59471	59863	60259	60661	61043	61483
58787	59149	59473	59879	60271	60679	61051	61487
58789	59159	59497	59887	60289	60689	61057	61493
58831	59167	59509	59921	60293	60703	61091	61507
58889	59183	59513	59929	60317	60719	61099	61511
58897	59197	59539	59951	60331	60727	61121	61519
58901	59207	59557	59957	60337	60733	61129	61543
58907	59209	59561	59971	60343	60737	61141	61547
58909	59219	59567	59981	60353	60757	61151	61553
58913	59221	59581	59999	60373	60761	61153	61559
58921	59233	59611	60013	60383	60763	61169	61561
58937	59239	59617	60017	60397	60773	61211	61583
58943	59243	59621	60029	60413	60779	61223	61603
58963	59263	59627	60037	60427	60793	61231	61609
58967	59273	59629	60041	60443	60811	61253	61613
58979	59281	59651	60077	60449	60821	61261	61627
58991	59333	59659	60083	60457	60859	61283	61631

61637	62017	62423	62819	63241	63577	63857	64303
61643	62039	62459	62827	63247	63587	63863	64319
61651	62047	62467	62851	63277	63589	63901	64327
61657	62053	62473	62861	63281	63599	63907	64333
61667	62057	62477	62869	63299	63601	63913	64373
61673	62071	62483	62873	63311	63607	63929	64381
61681	62081	62497	62897	63313	63611	63949	64399
61687	62099	62501	62903	63317	63617	63977	64403
61703	62119	62507	62921	63331	63629	63997	64433
61717	62129	62533	62927	63337	63647	64007	64439
61723	62131	62539	62929	63347	63649	64013	64451
61729	62137	62549	62939	63353	63659	64019	64453
61751	62141	62563	62969	63361	63667	64033	64483
61757	62143	62581	62971	63367	63671	64037	64489
61781	62171	62591	62981	63377	63689	64063	64499
61813	62189	62597	62983	63389	63691	64067	64513
61819	62191	62603	62987	63391	63697	64081	64553
61837	62201	62617	62989	63397	63703	64091	64567
61843	62207	62627	63029	63409	63709	64109	64577
61861	62213	62633	63031	63419	63719	64123	64579
61871	62219	62639	63059	63421	63727	64151	64591
61879	62233	62653	63067	63439	63737	64153	64601
61909	62273	62659	63073	63443	63743	64157	64609
61927	62297	62683	63079	63463	63761	64171	64613
61933	62299	62687	63097	63467	63773	64187	64621
61949	62303	62701	63103	63473	63781	64189	64627
61961	62311	62723	63113	63487	63793	64217	64633
61967	62323	62731	63127	63493	63799	64223	64661
61979	62327	62743	63131	63499	63803	64231	64663
61981	62347	62753	63149	63521	63809	64237	64667
61987	62351	62761	63179	63527	63823	64271	64679
61991	62383	62773	63197	63533	63839	64279	64693
62003	62401	62791	63199	63541	63841	64283	64709
62011	62417	62801	63211	63559	63853	64301	64717

64747	65123	65519	65831	66221	66629	67021	67391
64763	65129	65521	65837	66239	66643	67033	67399
64781	65141	65537	65839	66271	66653	67043	67409
64783	65147	65539	65843	66293	66683	67049	67411
64793	65167	65543	65851	66301	66697	67057	67421
64811	65171	65551	65867	66337	66701	67061	67427
64817	65173	65557	65881	66343	66713	67073	67429
64849	65179	65563	65899	66347	66721	67079	67433
64853	65183	65579	65921	66359	66733	67103	67447
64871	65203	65581	65927	66361	66739	67121	67453
64877	65213	65587	65929	66373	66749	67129	67477
64879	65239	65599	65951	66377	66751	67139	67481
64891	65257	65609	65957	66383	66763	67141	67489
64901	65267	65617	65963	66403	66791	67153	67493
64919	65269	65629	65981	66413	66797	67157	67499
64921	65287	65633	65983	66431	66809	67169	67511
64927	65293	65647	65993	66449	66821	67181	67523
64937	65309	65651	66029	66457	66841	67187	67531
64951	65323	65657	66037	66463	66851	67189	67537
64969	65327	65677	66041	66467	66853	67211	67547
64997	65353	65687	66047	66491	66863	67213	67559
65003	65357	65699	66067	66499	66877	67217	67567
65011	65371	65701	66071	66509	66883	67219	67577
65027	65381	65707	66083	66523	66889	67231	67579
65029	65393	65713	66089	66529	66919	67247	67589
65033	65407	65717	66103	66533	66923	67261	67601
65053	65413	65719	66107	66541	66931	67271	67607
65063	65419	65729	66109	66553	66943	67273	67619
65071	65423	65731	66137	66569	66947	67289	67631
65089	65437	65761	66161	66571	66949	67307	67651
65099	65447	65777	66169	66587	66959	67339	67679
65101	65449	65789	66173	66593	66973	67343	67699
65111	65479	65809	66179	66601	66977	67349	67709
65119	65497	65827	66191	66617	67003	67369	67723

67733	68071	68507	68899	69313	69761	70123	70481
67741	68087	68521	68903	69317	69763	70139	70487
67751	68099	68531	68909	69337	69767	70141	70489
67757	68111	68539	68917	69341	69779	70157	70501
67759	68113	68543	68927	69371	69809	70163	70507
67763	68141	68567	68947	69379	69821	70177	70529
67777	68147	68581	68963	69383	69827	70181	70537
67783	68161	68597	68993	69389	69829	70183	70549
67789	68171	68611	69001	69401	69833	70199	70571
67801	68207	68633	69011	69403	69847	70201	70573
67807	68209	68639	69019	69427	69857	70207	70583
67819	68213	68659	69029	69431	69859	70223	70589
67829	68219	68669	69031	69439	69877	70229	70607
67843	68227	68683	69061	69457	69899	70237	70619
67853	68239	68687	69067	69463	69911	70241	70621
67867	68261	68699	69073	69467	69929	70249	70627
67883	68279	68711	69109	69473	69931	70271	70639
67891	68281	68713	69119	69481	69941	70289	70657
67901	68311	68729	69127	69491	69959	70297	70663
67927	68329	68737	69143	69493	69991	70309	70667
67931	68351	68743	69149	69497	69997	70313	70687
67933	68371	68749	69151	69499	70001	70321	70709
67939	68389	68767	69163	69539	70003	70327	70717
67943	68399	68771	69191	69557	70009	70351	70729
67957	68437	68777	69193	69593	70019	70373	70753
67961	68443	68791	69197	69623	70039	70379	70769
67967	68447	68813	69203	69653	70051	70381	70783
67979	68449	68819	69221	69661	70061	70393	70793
67987	68473	68821	69233	69677	70067	70423	70823
67993	68477	68863	69239	69691	70079	70429	70841
68023	68483	68879	69247	69697	70099	70439	70843
68041	68489	68881	69257	69709	70111	70451	70849
68053	68491	68891	69259	69737	70117	70457	70853
68059	68501	68897	69263	69739	70121	70459	70867

70877	71233	71537	71917	72269	72673	73019	73471
70879	71237	71549	71933	72271	72679	73037	73477
70891	71249	71551	71941	72277	72689	73039	73483
70901	71257	71563	71947	72287	72701	73043	73517
70913	71261	71569	71963	72307	72707	73061	73523
70919	71263	71593	71971	72313	72719	73063	73529
70921	71287	71597	71983	72337	72727	73079	73547
70937	71293	71633	71987	72341	72733	73091	73553
70949	71317	71647	71993	72353	72739	73121	73561
70951	71327	71663	71999	72367	72763	73127	73571
70957	71329	71671	72019	72379	72767	73133	73583
70969	71333	71693	72031	72383	72797	73141	73589
70979	71339	71699	72043	72421	72817	73181	73597
70981	71341	71707	72047	72431	72823	73189	73607
70991	71347	71711	72053	72461	72859	73237	73609
70997	71353	71713	72073	72467	72869	73243	73613
70999	71359	71719	72077	72469	72871	73259	73637
71011	71363	71741	72089	72481	72883	73277	73643
71023	71387	71761	72091	72493	72889	73291	73651
71039	71389	71777	72101	72497	72893	73303	73673
71059	71399	71789	72103	72503	72901	73309	73679
71069	71411	71807	72109	72533	72907	73327	73681
71081	71413	71809	72139	72547	72911	73331	73693
71089	71419	71821	72161	72551	72923	73351	73699
71119	71429	71837	72167	72559	72931	73361	73709
71129	71437	71843	72169	72577	72937	73363	73721
71143	71443	71849	72173	72613	72949	73369	73727
71147	71453	71861	72211	72617	72953	73379	73751
71153	71471	71867	72221	72623	72959	73387	73757
71161	71473	71879	72223	72643	72973	73417	73771
71167	71479	71881	72227	72647	72977	73421	73783
71171	71483	71887	72229	72649	72997	73433	73819
71191	71503	71899	72251	72661	73009	73453	73823
71209	71527	71909	72253	72671	73013	73459	73847

73849	74209	74587	74933	75353	75707	76103	76511
73859	74219	74597	74941	75367	75709	76123	76519
73867	74231	74609	74959	75377	75721	76129	76537
73877	74257	74611	75011	75389	75731	76147	76541
73883	74279	74623	75013	75391	75743	76157	76543
73897	74287	74653	75017	75401	75767	76159	76561
73907	74293	74687	75029	75403	75773	76163	76579
73939	74297	74699	75037	75407	75781	76207	76597
73943	74311	74707	75041	75431	75787	76213	76603
73951	74317	74713	75079	75437	75793	76231	76607
73961	74323	74717	75083	75479	75797	76243	76631
73973	74353	74719	75109	75503	75821	76249	76649
73999	74357	74729	75133	75511	75833	76253	76651
74017	74363	74731	75149	75521	75853	76259	76667
74021	74377	74747	75161	75527	75869	76261	76673
74027	74381	74759	75167	75533	75883	76283	76679
74047	74383	74761	75169	75539	75913	76289	76697
74051	74411	74771	75181	75541	75931	76303	76717
74071	74413	74779	75193	75553	75937	76333	76733
74077	74419	74797	75209	75557	75941	76343	76753
74093	74441	74821	75211	75571	75967	76367	76757
74099	74449	74827	75217	75577	75979	76369	76771
74101	74453	74831	75223	75583	75983	76379	76777
74131	74471	74843	75227	75611	75989	76387	76781
74143	74489	74857	75239	75617	75991	76403	76801
74149	74507	74861	75253	75619	75997	76421	76819
74159	74509	74869	75269	75629	76001	76423	76829
74161	74521	74873	75277	75641	76003	76441	76831
74167	74527	74887	75289	75653	76031	76463	76837
74177	74531	74891	75307	75659	76039	76471	76847
74189	74551	74897	75323	75679	76079	76481	76871
74197	74561	74903	75329	75683	76081	76487	76873
74201	74567	74923	75337	75689	76091	76493	76883
74203	74573	74929	75347	75703	76099	76507	76907

76913	77291	77621	78007	78437	78809	79231	79613
76919	77317	77641	78017	78439	78823	79241	79621
76943	77323	77647	78031	78467	78839	79259	79627
76949	77339	77659	78041	78479	78853	79273	79631
76961	77347	77681	78049	78487	78857	79279	79633
76963	77351	77687	78059	78497	78877	79283	79657
76991	77359	77689	78079	78509	78887	79301	79669
77003	77369	77699	78101	78511	78889	79309	79687
77017	77377	77711	78121	78517	78893	79319	79691
77023	77383	77713	78137	78539	78901	79333	79693
77029	77417	77719	78139	78541	78919	79337	79697
77041	77419	77723	78157	78553	78929	79349	79699
77047	77431	77731	78163	78569	78941	79357	79757
77069	77447	77743	78167	78571	78977	79367	79769
77081	77471	77747	78173	78577	78979	79379	79777
77093	77477	77761	78179	78583	78989	79393	79801
77101	77479	77773	78191	78593	79031	79397	79811
77137	77489	77783	78193	78607	79039	79399	79813
77141	77491	77797	78203	78623	79043	79411	79817
77153	77509	77801	78229	78643	79063	79423	79823
77167	77513	77813	78233	78649	79087	79427	79829
77171	77521	77839	78241	78653	79103	79433	79841
77191	77527	77849	78259	78691	79111	79451	79843
77201	77543	77863	78277	78697	79133	79481	79847
77213	77549	77867	78283	78707	79139	79493	79861
77237	77551	77893	78301	78713	79147	79531	79867
77239	77557	77899	78307	78721	79151	79537	79873
77243	77563	77929	78311	78737	79153	79549	79889
77249	77569	77933	78317	78779	79159	79559	79901
77261	77573	77951	78341	78781	79181	79561	79903
77263	77587	77969	78347	78787	79187	79579	79907
77267	77591	77977	78367	78791	79193	79589	79939
77269	77611	77983	78401	78797	79201	79601	79943
77279	77617	77999	78427	78803	79229	79609	79967

79973	80341	80737	81049	81457	81847	82193	82561
79979	80347	80747	81071	81463	81853	82207	82567
79987	80363	80749	81077	81509	81869	82217	82571
79997	80369	80761	81083	81517	81883	82219	82591
79999	80387	80777	81097	81527	81899	82223	82601
80021	80407	80779	81101	81533	81901	82231	82609
80039	80429	80783	81119	81547	81919	82237	82613
80051	80447	80789	81131	81551	81929	82241	82619
80071	80449	80803	81157	81553	81931	82261	82633
80077	80471	80809	81163	81559	81937	82267	82651
80107	80473	80819	81173	81563	81943	82279	82657
80111	80489	80831	81181	81569	81953	82301	82699
80141	80491	80833	81197	81611	81967	82307	82721
80147	80513	80849	81199	81619	81971	82339	82723
80149	80527	80863	81203	81629	81973	82349	82727
80153	80537	80897	81223	81637	82003	82351	82729
80167	80557	80909	81233	81647	82007	82361	82757
80173	80567	80911	81239	81649	82009	82373	82759
80177	80599	80917	81281	81667	82013	82387	82763
80191	80603	80923	81283	81671	82021	82393	82781
80207	80611	80929	81293	81677	82031	82421	82787
80209	80621	80933	81299	81689	82037	82457	82793
80221	80627	80953	81307	81701	82039	82463	82799
80231	80629	80963	81331	81703	82051	82469	82811
80233	80651	80989	81343	81707	82067	82471	82813
80239	80657	81001	81349	81727	82073	82483	82837
80251	80669	81013	81353	81737	82129	82487	82847
80263	80671	81017	81359	81749	82139	82493	82883
80273	80677	81019	81371	81761	82141	82499	82889
80279	80681	81023	81373	81769	82153	82507	82891
80287	80683	81031	81401	81773	82163	82529	82903
80309	80687	81041	81409	81799	82171	82531	82913
80317	80701	81043	81421	81817	82183	82549	82939
80329	80713	81047	81439	81839	82189	82559	82963

82981	83389	83773	84191	84523	84977	85361	85717
82997	83399	83777	84199	84533	84979	85363	85733
83003	83401	83791	84211	84551	84991	85369	85751
83009	83407	83813	84221	84559	85009	85381	85781
83023	83417	83833	84223	84589	85021	85411	85793
83047	83423	83843	84229	84629	85027	85427	85817
83059	83431	83857	84239	84631	85037	85429	85819
83063	83437	83869	84247	84649	85049	85439	85829
83071	83443	83873	84263	84653	85061	85447	85831
83077	83449	83891	84299	84659	85081	85451	85837
83089	83459	83903	84307	84673	85087	85453	85843
83093	83471	83911	84313	84691	85091	85469	85847
83101	83477	83921	84317	84697	85093	85487	85853
83117	83497	83933	84319	84701	85103	85513	85889
83137	83537	83939	84347	84713	85109	85517	85903
83177	83557	83969	84349	84719	85121	85523	85909
83203	83561	83983	84377	84731	85133	85531	85931
83207	83563	83987	84389	84737	85147	85549	85933
83219	83579	84011	84391	84751	85159	85571	85991
83221	83591	84017	84401	84761	85193	85577	85999
83227	83597	84047	84407	84787	85199	85597	86011
83231	83609	84053	84421	84793	85201	85601	86017
83233	83617	84059	84431	84809	85213	85607	86027
83243	83621	84061	84437	84811	85223	85619	86029
83257	83639	84067	84443	84827	85229	85621	86069
83267	83641	84089	84449	84857	85237	85627	86077
83269	83653	84121	84457	84859	85243	85639	86083
83273	83663	84127	84463	84869	85247	85643	86111
83299	83689	84131	84467	84871	85259	85661	86113
83311	83701	84137	84481	84913	85297	85667	86117
83339	83717	84143	84499	84919	85303	85669	86131
83341	83719	84163	84503	84947	85313	85691	86137
83357	83737	84179	84509	84961	85331	85703	86143
83383	83761	84181	84521	84967	85333	85711	86161

86171	86491	86939	87317	87671	88019	88589	88937
86179	86501	86951	87323	87679	88037	88591	88951
86183	86509	86959	87337	87683	88069	88607	88969
86197	86531	86969	87359	87691	88079	88609	88993
86201	86533	86981	87383	87697	88093	88643	88997
86209	86539	86993	87403	87701	88117	88651	89003
86239	86561	87011	87407	87719	88129	88657	89009
86243	86573	87013	87421	87721	88169	88661	89017
86249	86579	87037	87427	87739	88177	88663	89021
86257	86587	87041	87433	87743	88211	88667	89041
86263	86599	87049	87443	87751	88223	88681	89051
86269	86627	87071	87473	87767	88237	88721	89057
86287	86629	87083	87481	87793	88241	88729	89069
86291	86677	87103	87491	87797	88259	88741	89071
86293	86689	87107	87509	87803	88261	88747	89083
86297	86693	87119	87511	87811	88289	88771	89087
86311	86711	87121	87517	87833	88301	88789	89101
86323	86719	87133	87523	87853	88321	88793	89107
86341	86729	87149	87539	87869	88327	88799	89113
86351	86743	87151	87541	87877	88337	88801	89119
86353	86753	87179	87547	87881	88339	88807	89123
86357	86767	87181	87553	87887	88379	88811	89137
86369	86771	87187	87557	87911	88397	88813	89153
86371	86783	87211	87559	87917	88411	88817	89189
86381	86813	87221	87583	87931	88423	88819	89203
86389	86837	87223	87587	87943	88427	88843	89209
86399	86843	87251	87589	87959	88463	88853	89213
86413	86851	87253	87613	87961	88469	88861	89227
86423	86857	87257	87623	87973	88471	88867	89231
86441	86861	87277	87629	87977	88493	88873	89237
86453	86869	87281	87631	87991	88499	88883	89261
86461	86923	87293	87641	88001	88513	88897	89269
86467	86927	87299	87643	88003	88523	88903	89273
86477	86929	87313	87649	88007	88547	88919	89293

89303	89657	90017	90379	90803	91183	91573	91997
89317	89659	90019	90397	90821	91193	91577	92003
89329	89669	90023	90401	90823	91199	91583	92009
89363	89671	90031	90403	90833	91229	91591	92033
89371	89681	90053	90407	90841	91237	91621	92041
89381	89689	90059	90437	90847	91243	91631	92051
89387	89753	90067	90439	90863	91249	91639	92077
89393	89759	90071	90469	90887	91253	91673	92083
89399	89767	90073	90473	90901	91283	91691	92107
89413	89779	90089	90481	90907	91291	91703	92111
89417	89783	90107	90499	90911	91297	91711	92119
89431	89797	90121	90511	90917	91303	91733	92143
89443	89809	90127	90523	90931	91309	91753	92153
89449	89819	90149	90527	90947	91331	91757	92173
89459	89821	90163	90529	90971	91367	91771	92177
89477	89833	90173	90533	90977	91369	91781	92179
89491	89839	90187	90547	90989	91373	91801	92189
89501	89849	90191	90583	90997	91381	91807	92203
89513	89867	90197	90599	91009	91387	91811	92219
89519	89891	90199	90617	91019	91393	91813	92221
89521	89897	90203	90619	91033	91397	91823	92227
89527	89899	90217	90631	91079	91411	91837	92233
89533	89909	90227	90641	91081	91423	91841	92237
89561	89917	90239	90647	91097	91433	91867	92243
89563	89923	90247	90659	91099	91453	91873	92251
89567	89939	90263	90677	91121	91457	91909	92269
89591	89959	90271	90679	91127	91459	91921	92297
89597	89963	90281	90697	91129	91463	91939	92311
89599	89977	90289	90703	91139	91493	91943	92317
89603	89983	90313	90709	91141	91499	91951	92333
89611	89989	90353	90731	91151	91513	91957	92347
89627	90001	90359	90749	91153	91529	91961	92353
89633	90007	90371	90787	91159	91541	91967	92357
89653	90011	90373	90793	91163	91571	91969	92363

92369	92699	93077	93427	93889	94261	94603	95009
92377	92707	93083	93463	93893	94273	94613	95021
92381	92717	93089	93479	93901	94291	94621	95027
92383	92723	93097	93481	93911	94307	94649	95063
92387	92737	93103	93487	93913	94309	94651	95071
92399	92753	93113	93491	93923	94321	94687	95083
92401	92761	93131	93493	93937	94327	94693	95087
92413	92767	93133	93497	93941	94331	94709	95089
92419	92779	93139	93503	93949	94343	94723	95093
92431	92789	93151	93523	93967	94349	94727	95101
92459	92791	93169	93529	93971	94351	94747	95107
92461	92801	93179	93553	93979	94379	94771	95111
92467	92809	93187	93557	93983	94397	94777	95131
92479	92821	93199	93559	93997	94399	94781	95143
92489	92831	93229	93563	94007	94421	94789	95153
92503	92849	93239	93581	94009	94427	94793	95177
92507	92857	93241	93601	94033	94433	94811	95189
92551	92861	93251	93607	94049	94439	94819	95191
92557	92863	93253	93629	94057	94441	94823	95203
92567	92867	93257	93637	94063	94447	94837	95213
92569	92893	93263	93683	94079	94463	94841	95219
92581	92899	93281	93701	94099	94477	94847	95231
92593	92921	93283	93703	94109	94483	94849	95233
92623	92927	93287	93719	94111	94513	94873	95239
92627	92941	93307	93739	94117	94529	94889	95257
92639	92951	93319	93761	94121	94531	94903	95261
92641	92957	93323	93763	94151	94541	94907	95267
92647	92959	93329	93787	94153	94543	94933	95273
92657	92987	93337	93809	94169	94547	94949	95279
92669	92993	93371	93811	94201	94559	94951	95287
92671	93001	93377	93827	94207	94561	94961	95311
92681	93047	93383	93851	94219	94573	94993	95317
92683	93053	93407	93871	94229	94583	94999	95327
92693	93059	93419	93887	94253	94597	95003	95339

95369	95731	96137	96497	96911	97369	97777	98207
95383	95737	96149	96517	96931	97373	97787	98213
95393	95747	96157	96527	96953	97379	97789	98221
95401	95773	96167	96553	96959	97381	97813	98227
95413	95783	96179	96557	96973	97387	97829	98251
95419	95789	96181	96581	96979	97397	97841	98257
95429	95791	96199	96587	96989	97423	97843	98269
95441	95801	96211	96589	96997	97429	97847	98297
95443	95803	96221	96601	97001	97441	97849	98299
95461	95813	96223	96643	97003	97453	97859	98317
95467	95819	96233	96661	97007	97459	97861	98321
95471	95857	96259	96667	97021	97463	97871	98323
95479	95869	96263	96671	97039	97499	97879	98327
95483	95873	96269	96697	97073	97501	97883	98347
95507	95881	96281	96703	97081	97511	97919	98369
95527	95891	96289	96731	97103	97523	97927	98377
95531	95911	96293	96737	97117	97547	97931	98387
95539	95917	96323	96739	97127	97549	97943	98389
95549	95923	96329	96749	97151	97553	97961	98407
95561	95929	96331	96757	97157	97561	97967	98411
95569	95947	96337	96763	97159	97571	97973	98419
95581	95957	96353	96769	97169	97577	97987	98429
95597	95959	96377	96779	97171	97579	98009	98443
95603	95971	96401	96787	97177	97583	98011	98453
95617	95987	96419	96797	97187	97607	98017	98459
95621	95989	96431	96799	97213	97609	98041	98467
95629	96001	96443	96821	97231	97613	98047	98473
95633	96013	96451	96823	97241	97649	98057	98479
95651	96017	96457	96827	97259	97651	98081	98491
95701	96043	96461	96847	97283	97673	98101	98507
95707	96053	96469	96851	97301	97687	98123	98519
95713	96059	96479	96857	97303	97711	98129	98533
95717	96079	96487	96893	97327	97729	98143	98543
95723	96097	96493	96907	97367	97771	98179	98561

98563	98939	99317	99713	100129	100517	100943	101323
98573	98947	99347	99719	100151	100519	100957	101333
98597	98953	99349	99721	100153	100523	100981	101341
98621	98963	99367	99733	100169	100537	100987	101347
98627	98981	99371	99761	100183	100547	100999	101359
98639	98993	99377	99767	100189	100549	101009	101363
98641	98999	99391	99787	100193	100559	101021	101377
98663	99013	99397	99793	100207	100591	101027	101383
98669	99017	99401	99809	100213	100609	101051	101399
98689	99023	99409	99817	100237	100613	101063	101411
98711	99041	99431	99823	100267	100621	101081	101419
98713	99053	99439	99829	100271	100649	101089	101429
98717	99079	99469	99833	100279	100669	101107	101449
98729	99083	99487	99839	100291	100673	101111	101467
98731	99089	99497	99859	100297	100693	101113	101477
98737	99103	99523	99871	100313	100699	101117	101483
98773	99109	99527	99877	100333	100703	101119	101489
98779	99119	99529	99881	100343	100733	101141	101501
98801	99131	99551	99901	100357	100741	101149	101503
98807	99133	99559	99907	100361	100747	101159	101513
98809	99137	99563	99923	100363	100769	101161	101527
98837	99139	99571	99929	100379	100787	101173	101531
98849	99149	99577	99961	100391	100799	101183	101533
98867	99173	99581	99971	100393	100801	101197	101537
98869	99181	99607	99989	100403	100811	101203	101561
98873	99191	99611	99991	100411	100823	101207	101573
98887	99223	99623	100003	100417	100829	101209	101581
98893	99233	99643	100019	100447	100847	101221	101599
98897	99241	99661	100043	100459	100853	101267	101603
98899	99251	99667	100049	100469	100907	101273	101611
98909	99257	99679	100057	100483	100913	101279	101627
98911	99259	99689	100069	100493	100927	101281	101641
98927	99277	99707	100103	100501	100931	101287	101653
98929	99289	99709	100109	100511	100937	101293	101663

101681	102031	102397	102797	103289	103681	104087	104479
101693	102043	102407	102811	103291	103687	104089	104491
101701	102059	102409	102829	103307	103699	104107	104513
101719	102061	102433	102841	103319	103703	104113	104527
101723	102071	102437	102859	103333	103723	104119	104537
101737	102077	102451	102871	103349	103769	104123	104543
101741	102079	102461	102877	103357	103787	104147	104549
101747	102101	102481	102881	103387	103801	104149	104551
101749	102103	102497	102911	103391	103811	104161	104561
101771	102107	102499	102913	103393	103813	104173	104579
101789	102121	102503	102929	103399	103837	104179	104593
101797	102139	102523	102931	103409	103841	104183	104597
101807	102149	102533	102953	103421	103843	104207	104623
101833	102161	102539	102967	103423	103867	104231	104639
101837	102181	102547	102983	103451	103889	104233	104651
101839	102191	102551	103001	103457	103903	104239	104659
101863	102197	102559	103007	103471	103913	104243	104677
101869	102199	102563	103043	103483	103919	104281	104681
101873	102203	102587	103049	103511	103951	104287	104683
101879	102217	102593	103067	103529	103963	104297	104693
101891	102229	102607	103069	103549	103967	104309	104701
101917	102233	102611	103079	103553	103969	104311	104707
101921	102241	102643	103087	103561	103979	104323	104711
101929	102251	102647	103091	103567	103981	104327	104717
101939	102253	102653	103093	103573	103991	104347	104723
101957	102259	102667	103099	103577	103993	104369	104729
101963	102293	102673	103123	103583	103997	104381	104743
101977	102299	102677	103141	103591	104003	104383	104759
101987	102301	102679	103171	103613	104009	104393	104761
101999	102317	102701	103177	103619	104021	104399	104773
102001	102329	102761	103183	103643	104033	104417	104779
102013	102337	102763	103217	103651	104047	104459	104789
102019	102359	102769	103231	103657	104053	104471	104801
102023	102367	102793	103237	103669	104059	104473	104803

104827	105263	105619	106087	106417	106783	107183	107693
104831	105269	105649	106103	106427	106787	107197	107699
104849	105277	105653	106109	106433	106801	107201	107713
104851	105319	105667	106121	106441	106823	107209	107717
104869	105323	105673	106123	106451	106853	107227	107719
104879	105331	105683	106129	106453	106859	107243	107741
104891	105337	105691	106163	106487	106861	107251	107747
104911	105341	105701	106181	106501	106867	107269	107761
104917	105359	105727	106187	106531	106871	107273	107773
104933	105361	105733	106189	106537	106877	107279	107777
104947	105367	105751	106207	106541	106903	107309	107791
104953	105373	105761	106213	106543	106907	107323	107827
104959	105379	105767	106217	106591	106921	107339	107837
104971	105389	105769	106219	106619	106937	107347	107839
104987	105397	105817	106243	106621	106949	107351	107843
104999	105401	105829	106261	106627	106957	107357	107857
105019	105407	105863	106273	106637	106961	107377	107867
105023	105437	105871	106277	106649	106963	107441	107873
105031	105449	105883	106279	106657	106979	107449	107881
105037	105467	105899	106291	106661	106993	107453	107897
105071	105491	105907	106297	106663	107021	107467	107903
105097	105499	105913	106303	106669	107033	107473	107923
105107	105503	105929	106307	106681	107053	107507	107927
105137	105509	105943	106319	106693	107057	107509	107941
105143	105517	105953	106321	106699	107069	107563	107951
105167	105527	105967	106331	106703	107071	107581	107971
105173	105529	105971	106349	106721	107077	107599	107981
105199	105533	105977	106357	106727	107089	107603	107999
105211	105541	105983	106363	106739	107099	107609	108007
105227	105557	105997	106367	106747	107101	107621	108011
105229	105563	106013	106373	106751	107119	107641	108013
105239	105601	106019	106391	106753	107123	107647	108023
105251	105607	106031	106397	106759	107137	107671	108037
105253	105613	106033	106411	106781	107171	107687	108041

108061	108457	108877	109199	109579	109943	110477	110821
108079	108461	108881	109201	109583	109961	110479	110849
108089	108463	108883	109211	109589	109987	110491	110863
108107	108497	108887	109229	109597	110017	110501	110879
108109	108499	108893	109253	109609	110023	110503	110881
108127	108503	108907	109267	109619	110039	110527	110899
108131	108517	108917	109279	109621	110051	110533	110909
108139	108529	108923	109297	109639	110059	110543	110917
108161	108533	108929	109303	109661	110063	110557	110921
108179	108541	108943	109313	109663	110069	110563	110923
108187	108553	108947	109321	109673	110083	110567	110927
108191	108557	108949	109331	109717	110119	110569	110933
108193	108571	108959	109357	109721	110129	110573	110939
108203	108587	108961	109363	109741	110161	110581	110947
108211	108631	108967	109367	109751	110183	110587	110951
108217	108637	108971	109379	109789	110221	110597	110969
108223	108643	108991	109387	109793	110233	110603	110977
108233	108649	109001	109391	109807	110237	110609	110989
108247	108677	109013	109397	109819	110251	110623	111029
108263	108707	109037	109423	109829	110261	110629	111031
108271	108709	109049	109433	109831	110269	110641	111043
108287	108727	109063	109441	109841	110273	110647	111049
108289	108739	109073	109451	109843	110281	110651	111053
108293	108751	109097	109453	109847	110291	110681	111091
108301	108761	109103	109469	109849	110311	110711	111103
108343	108769	109111	109471	109859	110321	110729	111109
108347	108791	109121	109481	109873	110323	110731	111119
108359	108793	109133	109507	109883	110339	110749	111121
108377	108799	109139	109517	109891	110359	110753	111127
108379	108803	109141	109519	109897	110419	110771	111143
108401	108821	109147	109537	109903	110431	110777	111149
108413	108827	109159	109541	109913	110437	110807	111187
108421	108863	109169	109547	109919	110441	110813	111191
108439	108869	109171	109567	109937	110459	110819	111211

111217	111637	112019	112349	112859	113159	113591	114013
111227	111641	112031	112361	112877	113161	113621	114031
111229	111653	112061	112363	112901	113167	113623	114041
111253	111659	112067	112397	112909	113171	113647	114043
111263	111667	112069	112403	112913	113173	113657	114067
111269	111697	112087	112429	112919	113177	113683	114073
111271	111721	112097	112459	112921	113189	113717	114077
111301	111731	112103	112481	112927	113209	113719	114083
111317	111733	112111	112501	112939	113213	113723	114089
111323	111751	112121	112507	112951	113227	113731	114113
111337	111767	112129	112543	112967	113233	113749	114143
111341	111773	112139	112559	112979	113279	113759	114157
111347	111779	112153	112571	112997	113287	113761	114161
111373	111781	112163	112573	113011	113327	113777	114167
111409	111791	112181	112577	113017	113329	113779	114193
111427	111799	112199	112583	113021	113341	113783	114197
111431	111821	112207	112589	113023	113357	113797	114199
111439	111827	112213	112601	113027	113359	113809	114203
111443	111829	112223	112603	113039	113363	113819	114217
111467	111833	112237	112621	113041	113371	113837	114221
111487	111847	112241	112643	113051	113381	113843	114229
111491	111857	112247	112657	113063	113383	113891	114259
111493	111863	112249	112663	113081	113417	113899	114269
111497	111869	112253	112687	113083	113437	113903	114277
111509	111871	112261	112691	113089	113453	113909	114281
111521	111893	112279	112741	113093	113467	113921	114299
111533	111913	112289	112757	113111	113489	113933	114311
111539	111919	112291	112759	113117	113497	113947	114319
111577	111949	112297	112771	113123	113501	113957	114329
111581	111953	112303	112787	113131	113513	113963	114343
111593	111959	112327	112799	113143	113537	113969	114371
111599	111973	112331	112807	113147	113539	113983	114377
111611	111977	112337	112831	113149	113557	113989	114407
111623	111997	112339	112843	113153	113567	114001	114419

114451	114809	115249	115657	115963	116387	116827	117209
114467	114827	115259	115663	115979	116411	116833	117223
114473	114833	115279	115679	115981	116423	116849	117239
114479	114847	115301	115693	115987	116437	116867	117241
114487	114859	115303	115727	116009	116443	116881	117251
114493	114883	115309	115733	116027	116447	116903	117259
114547	114889	115319	115741	116041	116461	116911	117269
114553	114901	115321	115751	116047	116471	116923	117281
114571	114913	115327	115757	116089	116483	116927	117307
114577	114941	115331	115763	116099	116491	116929	117319
114593	114967	115337	115769	116101	116507	116933	117329
114599	114973	115343	115771	116107	116531	116953	117331
114601	114997	115361	115777	116113	116533	116959	117353
114613	115001	115363	115781	116131	116537	116969	117361
114617	115013	115399	115783	116141	116539	116981	117371
114641	115019	115421	115793	116159	116549	116989	117373
114643	115021	115429	115807	116167	116579	116993	117389
114649	115057	115459	115811	116177	116593	117017	117413
114659	115061	115469	115823	116189	116639	117023	117427
114661	115067	115471	115831	116191	116657	117037	117431
114671	115079	115499	115837	116201	116663	117041	117437
114679	115099	115513	115849	116239	116681	117043	117443
114689	115117	115523	115853	116243	116687	117053	117497
114691	115123	115547	115859	116257	116689	117071	117499
114713	115127	115553	115861	116269	116707	117101	117503
114743	115133	115561	115873	116273	116719	117109	117511
114749	115151	115571	115877	116279	116731	117119	117517
114757	115153	115589	115879	116293	116741	117127	117529
114761	115163	115597	115883	116329	116747	117133	117539
114769	115183	115601	115891	116341	116789	117163	117541
114773	115201	115603	115901	116351	116791	117167	117563
114781	115211	115613	115903	116359	116797	117191	117571
114797	115223	115631	115931	116371	116803	117193	117577
114799	115237	115637	115933	116381	116819	117203	117617

117619	117973	118399	118801	119191	119657	119993	120401
117643	117977	118409	118819	119227	119659	120011	120413
117659	117979	118411	118831	119233	119671	120017	120427
117671	117989	118423	118843	119237	119677	120041	120431
117673	117991	118429	118861	119243	119687	120047	120473
117679	118033	118453	118873	119267	119689	120049	120503
117701	118037	118457	118891	119291	119699	120067	120511
117703	118043	118463	118897	119293	119701	120077	120539
117709	118051	118471	118901	119297	119723	120079	120551
117721	118057	118493	118903	119299	119737	120091	120557
117727	118061	118529	118907	119311	119747	120097	120563
117731	118081	118543	118913	119321	119759	120103	120569
117751	118093	118549	118927	119359	119771	120121	120577
117757	118127	118571	118931	119363	119773	120157	120587
117763	118147	118583	118967	119389	119783	120163	120607
117773	118163	118589	118973	119417	119797	120167	120619
117779	118169	118603	119027	119419	119809	120181	120623
117787	118171	118619	119033	119429	119813	120193	120641
117797	118189	118621	119039	119447	119827	120199	120647
117809	118211	118633	119047	119489	119831	120209	120661
117811	118213	118661	119057	119503	119839	120223	120671
117833	118219	118669	119069	119513	119849	120233	120677
117839	118247	118673	119083	119533	119851	120247	120689
117841	118249	118681	119087	119549	119869	120277	120691
117851	118253	118687	119089	119551	119881	120283	120709
117877	118259	118691	119099	119557	119891	120293	120713
117881	118273	118709	119101	119563	119921	120299	120721
117883	118277	118717	119107	119569	119923	120319	120737
117889	118297	118739	119129	119591	119929	120331	120739
117899	118343	118747	119131	119611	119953	120349	120749
117911	118361	118751	119159	119617	119963	120371	120763
117917	118369	118757	119173	119627	119971	120383	120767
117937	118373	118787	119179	119633	119981	120391	120779
117959	118387	118799	119183	119653	119983	120397	120811

120817	121157	121523	121951	122299	122701	123113	123503
120823	121169	121531	121963	122321	122719	123121	123517
120829	121171	121547	121967	122323	122741	123127	123527
120833	121181	121553	121993	122327	122743	123143	123547
120847	121189	121559	121997	122347	122753	123169	123551
120851	121229	121571	122011	122363	122761	123191	123553
120863	121259	121577	122021	122387	122777	123203	123581
120871	121267	121579	122027	122389	122789	123209	123583
120877	121271	121591	122029	122393	122819	123217	123593
120889	121283	121607	122033	122399	122827	123229	123601
120899	121291	121609	122039	122401	122833	123239	123619
120907	121309	121621	122041	122443	122839	123259	123631
120917	121313	121631	122051	122449	122849	123269	123637
120919	121321	121633	122053	122453	122861	123289	123653
120929	121327	121637	122069	122471	122867	123307	123661
120937	121333	121661	122081	122477	122869	123311	123667
120941	121343	121687	122099	122489	122887	123323	123677
120943	121349	121697	122117	122497	122891	123341	123701
120947	121351	121711	122131	122501	122921	123373	123707
120977	121357	121721	122147	122503	122929	123377	123719
120997	121367	121727	122149	122509	122939	123379	123727
121001	121369	121763	122167	122527	122953	123397	123731
121007	121379	121787	122173	122533	122957	123401	123733
121013	121403	121789	122201	122557	122963	123407	123737
121019	121421	121843	122203	122561	122971	123419	123757
121021	121439	121853	122207	122579	123001	123427	123787
121039	121441	121867	122209	122597	123007	123433	123791
121061	121447	121883	122219	122599	123017	123439	123803
121063	121453	121889	122231	122609	123031	123449	123817
121067	121469	121909	122251	122611	123049	123457	123821
121081	121487	121921	122263	122651	123059	123479	123829
121123	121493	121931	122267	122653	123077	123491	123833
121139	121501	121937	122273	122663	123083	123493	123853
121151	121507	121949	122279	122693	123091	123499	123863

123887	124301	124703	125113	125507	125899	126271	126703
123911	124303	124717	125117	125509	125921	126307	126713
123923	124309	124721	125119	125527	125927	126311	126719
123931	124337	124739	125131	125539	125929	126317	126733
123941	124339	124753	125141	125551	125933	126323	126739
123953	124343	124759	125149	125591	125941	126337	126743
123973	124349	124769	125183	125597	125959	126341	126751
123979	124351	124771	125197	125617	125963	126349	126757
123983	124363	124777	125201	125621	126001	126359	126761
123989	124367	124781	125207	125627	126011	126397	126781
123997	124427	124783	125219	125639	126013	126421	126823
124001	124429	124793	125221	125641	126019	126433	126827
124021	124433	124799	125231	125651	126023	126443	126839
124067	124447	124819	125243	125659	126031	126457	126851
124087	124459	124823	125261	125669	126037	126461	126857
124097	124471	124847	125269	125683	126041	126473	126859
124121	124477	124853	125287	125687	126047	126481	126913
124123	124489	124897	125299	125693	126067	126487	126923
124133	124493	124907	125303	125707	126079	126491	126943
124139	124513	124909	125311	125711	126097	126493	126949
124147	124529	124919	125329	125717	126107	126499	126961
124153	124541	124951	125339	125731	126127	126517	126967
124171	124543	124979	125353	125737	126131	126541	126989
124181	124561	124981	125371	125743	126143	126547	127031
124183	124567	124987	125383	125753	126151	126551	127033
124193	124577	124991	125387	125777	126173	126583	127037
124199	124601	125003	125399	125789	126199	126601	127051
124213	124633	125017	125407	125791	126211	126611	127079
124231	124643	125029	125423	125803	126223	126613	127081
124247	124669	125053	125429	125813	126227	126631	127103
124249	124673	125063	125441	125821	126229	126641	127123
124277	124679	125093	125453	125863	126233	126653	127133
124291	124693	125101	125471	125887	126241	126683	127139
124297	124699	125107	125497	125897	126257	126691	127157

127163	127591	127913	128341	128683	129083	129469	129893
127189	127597	127921	128347	128693	129089	129491	129901
127207	127601	127931	128351	128717	129097	129497	129917
127217	127607	127951	128377	128747	129113	129499	129919
127219	127609	127973	128389	128749	129119	129509	129937
127241	127637	127979	128393	128761	129121	129517	129953
127247	127643	127997	128399	128767	129127	129527	129959
127249	127649	128021	128411	128813	129169	129529	129967
127261	127657	128033	128413	128819	129187	129533	129971
127271	127663	128047	128431	128831	129193	129539	130003
127277	127669	128053	128437	128833	129197	129553	130021
127289	127679	128099	128449	128837	129209	129581	130027
127291	127681	128111	128461	128857	129221	129587	130043
127297	127691	128113	128467	128861	129223	129589	130051
127301	127703	128119	128473	128873	129229	129593	130057
127321	127709	128147	128477	128879	129263	129607	130069
127331	127711	128153	128483	128903	129277	129629	130073
127343	127717	128159	128489	128923	129281	129631	130079
127363	127727	128173	128509	128939	129287	129641	130087
127373	127733	128189	128519	128941	129289	129643	130099
127399	127739	128201	128521	128951	129293	129671	130121
127403	127747	128203	128549	128959	129313	129707	130127
127423	127763	128213	128551	128969	129341	129719	130147
127447	127781	128221	128563	128971	129347	129733	130171
127453	127807	128237	128591	128981	129361	129737	130183
127481	127817	128239	128599	128983	129379	129749	130199
127487	127819	128257	128603	128987	129401	129757	130201
127493	127837	128273	128621	128993	129403	129763	130211
127507	127843	128287	128629	129001	129419	129769	130223
127529	127849	128291	128657	129011	129439	129793	130241
127541	127859	128311	128659	129023	129443	129803	130253
127549	127867	128321	128663	129037	129449	129841	130259
127579	127873	128327	128669	129049	129457	129853	130261
127583	127877	128339	128677	129061	129461	129887	130267

130279	130643	131111	131507	131927	132347	132707	133103
130303	130649	131113	131519	131933	132361	132709	133109
130307	130651	131129	131543	131939	132367	132721	133117
130337	130657	131143	131561	131941	132371	132739	133121
130343	130681	131149	131581	131947	132383	132749	133153
130349	130687	131171	131591	131959	132403	132751	133157
130363	130693	131203	131611	131969	132409	132757	133169
130367	130699	131213	131617	132001	132421	132761	133183
130369	130729	131221	131627	132019	132437	132763	133187
130379	130769	131231	131639	132047	132439	132817	133201
130399	130783	131249	131641	132049	132469	132833	133213
130409	130787	131251	131671	132059	132491	132851	133241
130411	130807	131267	131687	132071	132499	132857	133253
130423	130811	131293	131701	132103	132511	132859	133261
130439	130817	131297	131707	132109	132523	132863	133271
130447	130829	131303	131711	132113	132527	132887	133277
130457	130841	131311	131713	132137	132529	132893	133279
130469	130843	131317	131731	132151	132533	132911	133283
130477	130859	131321	131743	132157	132541	132929	133303
130483	130873	131357	131749	132169	132547	132947	133319
130489	130927	131363	131759	132173	132589	132949	133321
130513	130957	131371	131771	132199	132607	132953	133327
130517	130969	131381	131777	132229	132611	132961	133337
130523	130973	131413	131779	132233	132619	132967	133349
130531	130981	131431	131783	132241	132623	132971	133351
130547	130987	131437	131797	132247	132631	132989	133379
130553	131009	131441	131837	132257	132637	133013	133387
130579	131011	131447	131839	132263	132647	133033	133391
130589	131023	131449	131849	132283	132661	133039	133403
130619	131041	131477	131861	132287	132667	133051	133417
130621	131059	131479	131891	132299	132679	133069	133439
130631	131063	131489	131893	132313	132689	133073	133447
130633	131071	131497	131899	132329	132697	133087	133451
130639	131101	131501	131909	132331	132701	133097	133481

133493	133963	134333	134777	135197	135571	135913	136337
133499	133967	134339	134789	135209	135581	135929	136343
133519	133979	134341	134807	135211	135589	135937	136351
133541	133981	134353	134837	135221	135593	135977	136361
133543	133993	134359	134839	135241	135599	135979	136373
133559	133999	134363	134851	135257	135601	136013	136379
133571	134033	134369	134857	135271	135607	136027	136393
133583	134039	134371	134867	135277	135613	136033	136397
133597	134047	134399	134873	135281	135617	136043	136399
133631	134053	134401	134887	135283	135623	136057	136403
133633	134059	134417	134909	135301	135637	136067	136417
133649	134077	134437	134917	135319	135647	136069	136421
133657	134081	134443	134921	135329	135649	136093	136429
133669	134087	134471	134923	135347	135661	136099	136447
133673	134089	134489	134947	135349	135671	136111	136453
133691	134093	134503	134951	135353	135697	136133	136463
133697	134129	134507	134989	135367	135701	136139	136471
133709	134153	134513	134999	135389	135719	136163	136481
133711	134161	134581	135007	135391	135721	136177	136483
133717	134171	134587	135017	135403	135727	136189	136501
133723	134177	134591	135019	135409	135731	136193	136511
133733	134191	134593	135029	135427	135743	136207	136519
133769	134207	134597	135043	135431	135757	136217	136523
133781	134213	134609	135049	135433	135781	136223	136531
133801	134219	134639	135059	135449	135787	136237	136537
133811	134227	134669	135077	135461	135799	136247	136541
133813	134243	134677	135089	135463	135829	136261	136547
133831	134257	134681	135101	135467	135841	136273	136559
133843	134263	134683	135119	135469	135851	136277	136573
133853	134269	134699	135131	135479	135859	136303	136601
133873	134287	134707	135151	135497	135887	136309	136603
133877	134291	134731	135173	135511	135893	136319	136607
133919	134293	134741	135181	135533	135899	136327	136621
133949	134327	134753	135193	135559	135911	136333	136649

136651	137077	137443	137873	138283	138637	139121	139493
136657	137087	137447	137909	138289	138641	139123	139501
136691	137089	137453	137911	138311	138647	139133	139511
136693	137117	137477	137927	138319	138661	139169	139537
136709	137119	137483	137933	138323	138679	139177	139547
136711	137131	137491	137941	138337	138683	139187	139571
136727	137143	137507	137947	138349	138727	139199	139589
136733	137147	137519	137957	138371	138731	139201	139591
136739	137153	137537	137983	138373	138739	139241	139597
136751	137177	137567	137993	138389	138763	139267	139609
136753	137183	137573	137999	138401	138793	139273	139619
136769	137191	137587	138007	138403	138797	139291	139627
136777	137197	137593	138041	138407	138799	139297	139661
136811	137201	137597	138053	138427	138821	139301	139663
136813	137209	137623	138059	138433	138829	139303	139681
136841	137219	137633	138071	138449	138841	139309	139697
136849	137239	137639	138077	138451	138863	139313	139703
136859	137251	137653	138079	138461	138869	139333	139709
136861	137273	137659	138101	138469	138883	139339	139721
136879	137279	137699	138107	138493	138889	139343	139729
136883	137303	137707	138113	138497	138893	139361	139739
136889	137321	137713	138139	138511	138899	139367	139747
136897	137339	137723	138143	138517	138917	139369	139753
136943	137341	137737	138157	138547	138923	139387	139759
136949	137353	137743	138163	138559	138937	139393	139787
136951	137359	137771	138179	138563	138959	139397	139801
136963	137363	137777	138181	138569	138967	139409	139813
136973	137369	137791	138191	138571	138977	139423	139831
136979	137383	137803	138197	138577	139021	139429	139837
136987	137387	137827	138209	138581	139033	139439	139861
136991	137393	137831	138239	138587	139067	139457	139871
136993	137399	137849	138241	138599	139079	139459	139883
136999	137413	137867	138247	138617	139091	139483	139891
137029	137437	137869	138251	138629	139109	139487	139901

139907	140321	140681	141079	141497	141833	142217	142673
139921	140333	140683	141101	141499	141851	142223	142697
139939	140339	140689	141107	141509	141853	142231	142699
139943	140351	140717	141121	141511	141863	142237	142711
139967	140363	140729	141131	141529	141871	142271	142733
139969	140381	140731	141157	141539	141907	142297	142757
139981	140401	140741	141161	141551	141917	142319	142759
139987	140407	140759	141179	141587	141931	142327	142771
139991	140411	140761	141181	141601	141937	142357	142787
139999	140417	140773	141199	141613	141941	142369	142789
140009	140419	140779	141209	141619	141959	142381	142799
140053	140423	140797	141221	141623	141961	142391	142811
140057	140443	140813	141223	141629	141971	142403	142837
140069	140449	140827	141233	141637	141991	142421	142841
140071	140453	140831	141241	141649	142007	142427	142867
140111	140473	140837	141257	141653	142019	142433	142871
140123	140477	140839	141263	141667	142031	142453	142873
140143	140521	140863	141269	141671	142039	142469	142897
140159	140527	140867	141277	141677	142049	142501	142903
140167	140533	140869	141283	141679	142057	142529	142907
140171	140549	140891	141301	141689	142061	142537	142939
140177	140551	140893	141307	141697	142067	142543	142949
140191	140557	140897	141311	141707	142097	142547	142963
140197	140587	140909	141319	141709	142099	142553	142969
140207	140593	140929	141353	141719	142111	142559	142973
140221	140603	140939	141359	141731	142123	142567	142979
140227	140611	140977	141371	141761	142151	142573	142981
140237	140617	140983	141397	141767	142157	142589	142993
140249	140627	140989	141403	141769	142159	142591	143053
140263	140629	141023	141413	141773	142169	142601	143063
140269	140639	141041	141439	141793	142183	142607	143093
140281	140659	141061	141443	141803	142189	142609	143107
140297	140663	141067	141461	141811	142193	142619	143111
140317	140677	141073	141481	141829	142211	142657	143113

143137	143551	143977	144413	144829	145267	145643	146023
143141	143567	143981	144427	144839	145283	145661	146033
143159	143569	143999	144439	144847	145289	145679	146051
143177	143573	144013	144451	144883	145303	145681	146057
143197	143593	144031	144461	144887	145307	145687	146059
143239	143609	144037	144479	144889	145349	145703	146063
143243	143617	144061	144481	144899	145361	145709	146077
143249	143629	144071	144497	144917	145381	145721	146093
143257	143651	144073	144511	144931	145391	145723	146099
143261	143653	144103	144539	144941	145399	145753	146117
143263	143669	144139	144541	144961	145417	145757	146141
143281	143677	144161	144563	144967	145423	145759	146161
143287	143687	144163	144569	144973	145433	145771	146173
143291	143699	144167	144577	144983	145441	145777	146191
143329	143711	144169	144583	145007	145451	145799	146197
143333	143719	144173	144589	145009	145459	145807	146203
143357	143729	144203	144593	145021	145463	145819	146213
143387	143743	144223	144611	145031	145471	145823	146221
143401	143779	144241	144629	145037	145477	145829	146239
143413	143791	144247	144659	145043	145487	145861	146249
143419	143797	144253	144667	145063	145501	145879	146273
143443	143807	144259	144671	145069	145511	145897	146291
143461	143813	144271	144701	145091	145513	145903	146297
143467	143821	144289	144709	145109	145517	145931	146299
143477	143827	144299	144719	145121	145531	145933	146309
143483	143831	144307	144731	145133	145543	145949	146317
143489	143833	144311	144737	145139	145547	145963	146323
143501	143873	144323	144751	145177	145549	145967	146347
143503	143879	144341	144757	145193	145577	145969	146359
143509	143881	144349	144763	145207	145589	145987	146369
143513	143909	144379	144773	145213	145601	145991	146381
143519	143947	144383	144779	145219	145603	146009	146383
143527	143953	144407	144791	145253	145633	146011	146389
143537	143971	144409	144817	145259	145637	146021	146407

146417	146849	147263	147647	148091	148513	148921	149251
146423	146857	147283	147661	148123	148517	148927	149257
146437	146891	147289	147671	148139	148531	148931	149269
146449	146893	147293	147673	148147	148537	148933	149287
146477	146917	147299	147689	148151	148549	148949	149297
146513	146921	147311	147703	148153	148573	148957	149309
146519	146933	147319	147709	148157	148579	148961	149323
146521	146941	147331	147727	148171	148609	148991	149333
146527	146953	147341	147739	148193	148627	148997	149341
146539	146977	147347	147743	148199	148633	149011	149351
146543	146983	147353	147761	148201	148639	149021	149371
146563	146987	147377	147769	148207	148663	149027	149377
146581	146989	147391	147773	148229	148667	149033	149381
146603	147011	147397	147779	148243	148669	149053	149393
146609	147029	147401	147787	148249	148691	149057	149399
146617	147031	147409	147793	148279	148693	149059	149411
146639	147047	147419	147799	148301	148711	149069	149417
146647	147073	147449	147811	148303	148721	149077	149419
146669	147083	147451	147827	148331	148723	149087	149423
146677	147089	147457	147853	148339	148727	149099	149441
146681	147097	147481	147859	148361	148747	149101	149459
146683	147107	147487	147863	148367	148763	149111	149489
146701	147137	147503	147881	148381	148781	149113	149491
146719	147139	147517	147919	148387	148783	149119	149497
146743	147151	147541	147937	148399	148793	149143	149503
146749	147163	147547	147949	148403	148817	149153	149519
146767	147179	147551	147977	148411	148829	149159	149521
146777	147197	147557	147997	148429	148853	149161	149531
146801	147209	147571	148013	148439	148859	149173	149533
146807	147211	147583	148021	148457	148861	149183	149543
146819	147221	147607	148061	148469	148867	149197	149551
146833	147227	147613	148063	148471	148873	149213	149561
146837	147229	147617	148073	148483	148891	149239	149563
146843	147253	147629	148079	148501	148913	149249	149579

149603	150041	150407	150869	151241	151597	151939	152389
149623	150053	150413	150881	151243	151603	151967	152393
149627	150061	150427	150883	151247	151607	151969	152407
149629	150067	150431	150889	151253	151609	152003	152417
149689	150077	150439	150893	151273	151631	152017	152419
149711	150083	150473	150901	151279	151637	152027	152423
149713	150089	150497	150907	151289	151643	152029	152429
149717	150091	150503	150919	151303	151651	152039	152441
149729	150097	150517	150929	151337	151667	152041	152443
149731	150107	150523	150959	151339	151673	152063	152459
149749	150131	150533	150961	151343	151681	152077	152461
149759	150151	150551	150967	151357	151687	152081	152501
149767	150169	150559	150979	151379	151693	152083	152519
149771	150193	150571	150989	151381	151703	152093	152531
149791	150197	150583	150991	151391	151717	152111	152533
149803	150203	150587	151007	151397	151729	152123	152539
149827	150209	150589	151009	151423	151733	152147	152563
149837	150211	150607	151013	151429	151769	152183	152567
149839	150217	150611	151027	151433	151771	152189	152597
149861	150221	150617	151049	151451	151783	152197	152599
149867	150223	150649	151051	151471	151787	152203	152617
149873	150239	150659	151057	151477	151799	152213	152623
149893	150247	150697	151091	151483	151813	152219	152629
149899	150287	150707	151121	151499	151817	152231	152639
149909	150299	150721	151141	151507	151841	152239	152641
149911	150301	150743	151153	151517	151847	152249	152657
149921	150323	150767	151157	151523	151849	152267	152671
149939	150329	150769	151163	151531	151871	152287	152681
149953	150343	150779	151169	151537	151883	152293	152717
149969	150373	150791	151171	151549	151897	152297	152723
149971	150377	150797	151189	151553	151901	152311	152729
149993	150379	150827	151201	151561	151903	152363	152753
150001	150383	150833	151213	151573	151909	152377	152767
150011	150401	150847	151237	151579	151937	152381	152777

152783	153151	153557	154043	154409	154823	155231	155627
152791	153191	153563	154057	154417	154841	155251	155653
152809	153247	153589	154061	154423	154849	155269	155657
152819	153259	153607	154067	154439	154871	155291	155663
152821	153269	153611	154073	154459	154873	155299	155671
152833	153271	153623	154079	154487	154877	155303	155689
152837	153277	153641	154081	154493	154883	155317	155693
152839	153281	153649	154087	154501	154897	155327	155699
152843	153287	153689	154097	154523	154927	155333	155707
152851	153313	153701	154111	154543	154933	155371	155717
152857	153319	153719	154127	154571	154937	155377	155719
152879	153337	153733	154153	154573	154943	155381	155723
152897	153343	153739	154157	154579	154981	155383	155731
152899	153353	153743	154159	154589	154991	155387	155741
152909	153359	153749	154181	154591	155003	155399	155747
152939	153371	153757	154183	154613	155009	155413	155773
152941	153379	153763	154211	154619	155017	155423	155777
152947	153407	153817	154213	154621	155027	155443	155783
152953	153409	153841	154229	154643	155047	155453	155797
152959	153421	153871	154243	154667	155069	155461	155801
152981	153427	153877	154247	154669	155081	155473	155809
152989	153437	153887	154267	154681	155083	155501	155821
152993	153443	153889	154277	154691	155087	155509	155833
153001	153449	153911	154279	154699	155119	155521	155849
153059	153457	153913	154291	154723	155137	155537	155851
153067	153469	153929	154303	154727	155153	155539	155861
153071	153487	153941	154313	154733	155161	155557	155863
153073	153499	153947	154321	154747	155167	155569	155887
153077	153509	153949	154333	154753	155171	155579	155891
153089	153511	153953	154339	154769	155191	155581	155893
153107	153521	153991	154351	154787	155201	155593	155921
153113	153523	153997	154369	154789	155203	155599	156007
153133	153529	154001	154373	154799	155209	155609	156011
153137	153533	154027	154387	154807	155219	155621	156019

156041	156511	156941	157273	157679	158141	158567	159013
156059	156521	156943	157277	157721	158143	158573	159017
156061	156539	156967	157279	157733	158161	158581	159023
156071	156577	156971	157291	157739	158189	158591	159059
156089	156589	156979	157303	157747	158201	158597	159073
156109	156593	157007	157307	157769	158209	158611	159079
156119	156601	157013	157321	157771	158227	158617	159097
156127	156619	157019	157327	157793	158231	158621	159113
156131	156623	157037	157349	157799	158233	158633	159119
156139	156631	157049	157351	157813	158243	158647	159157
156151	156641	157051	157363	157823	158261	158657	159161
156157	156659	157057	157393	157831	158269	158663	159167
156217	156671	157061	157411	157837	158293	158699	159169
156227	156677	157081	157427	157841	158303	158731	159179
156229	156679	157103	157429	157867	158329	158747	159191
156241	156683	157109	157433	157877	158341	158749	159193
156253	156691	157127	157457	157889	158351	158759	159199
156257	156703	157133	157477	157897	158357	158761	159209
156259	156707	157141	157483	157901	158359	158771	159223
156269	156719	157163	157489	157907	158363	158777	159227
156307	156727	157177	157513	157931	158371	158791	159233
156319	156733	157181	157519	157933	158393	158803	159287
156329	156749	157189	157523	157951	158407	158843	159293
156347	156781	157207	157543	157991	158419	158849	159311
156353	156797	157211	157559	157999	158429	158863	159319
156361	156799	157217	157561	158003	158443	158867	159337
156371	156817	157219	157571	158009	158449	158881	159347
156419	156823	157229	157579	158017	158489	158909	159349
156421	156833	157231	157627	158029	158507	158923	159361
156437	156841	157243	157637	158047	158519	158927	159389
156467	156887	157247	157639	158071	158527	158941	159403
156487	156899	157253	157649	158077	158537	158959	159407
156491	156901	157259	157667	158113	158551	158981	159421
156493	156913	157271	157669	158129	158563	158993	159431

159437	159787	160183	160637	161009	161453	161831	162287
159457	159791	160201	160639	161017	161459	161839	162289
159463	159793	160207	160649	161033	161461	161869	162293
159469	159799	160217	160651	161039	161471	161873	162343
159473	159811	160231	160663	161047	161503	161879	162359
159491	159833	160243	160669	161053	161507	161881	162389
159499	159839	160253	160681	161059	161521	161911	162391
159503	159853	160309	160687	161071	161527	161921	162413
159521	159857	160313	160697	161087	161531	161923	162419
159539	159869	160319	160709	161093	161543	161947	162439
159541	159871	160343	160711	161123	161561	161957	162451
159553	159899	160357	160723	161137	161563	161969	162457
159563	159911	160367	160739	161141	161569	161971	162473
159569	159931	160373	160751	161149	161573	161977	162493
159571	159937	160387	160753	161159	161591	161983	162499
159589	159977	160397	160757	161167	161599	161999	162517
159617	159979	160403	160781	161201	161611	162007	162523
159623	160001	160409	160789	161221	161627	162011	162527
159629	160009	160423	160807	161233	161639	162017	162529
159631	160019	160441	160813	161237	161641	162053	162553
159667	160031	160453	160817	161263	161659	162059	162557
159671	160033	160481	160829	161267	161683	162079	162563
159673	160049	160483	160841	161281	161717	162091	162577
159683	160073	160499	160861	161303	161729	162109	162593
159697	160079	160507	160877	161309	161731	162119	162601
159701	160081	160541	160879	161323	161741	162143	162611
159707	160087	160553	160883	161333	161743	162209	162623
159721	160091	160579	160903	161339	161753	162221	162629
159737	160093	160583	160907	161341	161761	162229	162641
159739	160117	160591	160933	161363	161771	162251	162649
159763	160141	160603	160967	161377	161773	162257	162671
159769	160159	160619	160969	161387	161779	162263	162677
159773	160163	160621	160981	161407	161783	162269	162683
159779	160169	160627	160997	161411	161807	162277	162691

162703	163063	163483	163901	164291	164701	165211	165589
162709	163109	163487	163909	164299	164707	165229	165601
162713	163117	163517	163927	164309	164729	165233	165611
162727	163127	163543	163973	164321	164743	165247	165617
162731	163129	163561	163979	164341	164767	165287	165653
162739	163147	163567	163981	164357	164771	165293	165667
162749	163151	163573	163987	164363	164789	165311	165673
162751	163169	163601	163991	164371	164809	165313	165701
162779	163171	163613	163993	164377	164821	165317	165703
162787	163181	163621	163997	164387	164831	165331	165707
162791	163193	163627	164011	164413	164837	165343	165709
162821	163199	163633	164023	164419	164839	165349	165713
162823	163211	163637	164039	164429	164881	165367	165719
162829	163223	163643	164051	164431	164893	165379	165721
162839	163243	163661	164057	164443	164911	165383	165749
162847	163249	163673	164071	164447	164953	165391	165779
162853	163259	163679	164089	164449	164963	165397	165799
162859	163307	163697	164093	164471	164987	165437	165811
162881	163309	163729	164113	164477	164999	165443	165817
162889	163321	163733	164117	164503	165001	165449	165829
162901	163327	163741	164147	164513	165037	165457	165833
162907	163337	163753	164149	164531	165041	165463	165857
162917	163351	163771	164173	164569	165047	165469	165877
162937	163363	163781	164183	164581	165049	165479	165883
162947	163367	163789	164191	164587	165059	165511	165887
162971	163393	163811	164201	164599	165079	165523	165901
162973	163403	163819	164209	164617	165083	165527	165931
162989	163409	163841	164231	164621	165089	165533	165941
162997	163411	163847	164233	164623	165103	165541	165947
163003	163417	163853	164239	164627	165133	165551	165961
163019	163433	163859	164249	164653	165161	165553	165983
163021	163469	163861	164251	164663	165173	165559	166013
163027	163477	163871	164267	164677	165181	165569	166021
163061	163481	163883	164279	164683	165203	165587	166027

166031	166487	166867	167221	167641	168109	168599	169049
166043	166541	166871	167249	167663	168127	168601	169063
166063	166561	166909	167261	167677	168143	168617	169067
166081	166567	166919	167267	167683	168151	168629	169069
166099	166571	166931	167269	167711	168193	168631	169079
166147	166597	166949	167309	167729	168197	168643	169093
166151	166601	166967	167311	167747	168211	168673	169097
166157	166603	166973	167317	167759	168227	168677	169111
166169	166609	166979	167329	167771	168247	168697	169129
166183	166613	166987	167339	167777	168253	168713	169151
166189	166619	167009	167341	167779	168263	168719	169159
166207	166627	167017	167381	167801	168269	168731	169177
166219	166631	167021	167393	167809	168277	168737	169181
166237	166643	167023	167407	167861	168281	168743	169199
166247	166657	167033	167413	167863	168293	168761	169217
166259	166667	167039	167423	167873	168323	168769	169219
166273	166669	167047	167429	167879	168331	168781	169241
166289	166679	167051	167437	167887	168347	168803	169243
166297	166693	167071	167441	167891	168353	168851	169249
166301	166703	167077	167443	167899	168391	168863	169259
166303	166723	167081	167449	167911	168409	168869	169283
166319	166739	167087	167471	167917	168433	168887	169307
166349	166741	167099	167483	167953	168449	168893	169313
166351	166781	167107	167491	167971	168451	168899	169319
166357	166783	167113	167521	167987	168457	168901	169321
166363	166799	167117	167537	168013	168463	168913	169327
166393	166807	167119	167543	168023	168481	168937	169339
166399	166823	167149	167593	168029	168491	168943	169343
166403	166841	167159	167597	168037	168499	168977	169361
166409	166843	167173	167611	168043	168523	168991	169369
166417	166847	167177	167621	168067	168527	169003	169373
166429	166849	167191	167623	168071	168533	169007	169399
166457	166853	167197	167627	168083	168541	169009	169409
166471	166861	167213	167633	168089	168559	169019	169427

169457	169837	170231	170609	171007	171467	171823	172223
169471	169843	170239	170627	171023	171469	171827	172243
169483	169859	170243	170633	171029	171473	171851	172259
169489	169889	170249	170641	171043	171481	171863	172279
169493	169891	170263	170647	171047	171491	171869	172283
169501	169909	170267	170669	171049	171517	171877	172297
169523	169913	170279	170689	171053	171529	171881	172307
169531	169919	170293	170701	171077	171539	171889	172313
169553	169933	170299	170707	171079	171541	171917	172321
169567	169937	170327	170711	171091	171553	171923	172331
169583	169943	170341	170741	171103	171559	171929	172343
169591	169951	170347	170749	171131	171571	171937	172351
169607	169957	170351	170759	171161	171583	171947	172357
169627	169987	170353	170761	171163	171617	172001	172373
169633	169991	170363	170767	171167	171629	172009	172399
169639	170003	170369	170773	171169	171637	172021	172411
169649	170021	170371	170777	171179	171641	172027	172421
169657	170029	170383	170801	171203	171653	172031	172423
169661	170047	170389	170809	171233	171659	172049	172427
169667	170057	170393	170813	171251	171671	172069	172433
169681	170063	170413	170827	171253	171673	172079	172439
169691	170081	170441	170837	171263	171679	172093	172441
169693	170099	170447	170843	171271	171697	172097	172489
169709	170101	170473	170851	171293	171707	172127	172507
169733	170111	170483	170857	171299	171713	172147	172517
169751	170123	170497	170873	171317	171719	172153	172519
169753	170141	170503	170881	171329	171733	172157	172541
169769	170167	170509	170887	171341	171757	172169	172553
169777	170179	170537	170899	171383	171761	172171	172561
169783	170189	170539	170921	171401	171763	172181	172573
169789	170197	170551	170927	171403	171793	172199	172583
169817	170207	170557	170953	171427	171799	172213	172589
169823	170213	170579	170957	171439	171803	172217	172597
169831	170227	170603	170971	171449	171811	172219	172603

172607	173021	173497	173867	174263	174673	175103	175649
172619	173023	173501	173891	174281	174679	175129	175663
172633	173039	173531	173897	174289	174703	175141	175673
172643	173053	173539	173909	174299	174721	175211	175687
172649	173059	173543	173917	174311	174737	175229	175691
172657	173081	173549	173923	174329	174749	175261	175699
172663	173087	173561	173933	174331	174761	175267	175709
172673	173099	173573	173969	174337	174763	175277	175723
172681	173137	173599	173977	174347	174767	175291	175727
172687	173141	173617	173981	174367	174773	175303	175753
172709	173149	173629	173993	174389	174799	175309	175757
172717	173177	173647	174007	174407	174821	175327	175759
172721	173183	173651	174017	174413	174829	175333	175781
172741	173189	173659	174019	174431	174851	175349	175783
172751	173191	173669	174047	174443	174859	175361	175811
172759	173207	173671	174049	174457	174877	175391	175829
172787	173209	173683	174061	174467	174893	175393	175837
172801	173219	173687	174067	174469	174901	175403	175843
172807	173249	173699	174071	174481	174907	175411	175853
172829	173263	173707	174077	174487	174917	175433	175859
172849	173267	173713	174079	174491	174929	175447	175873
172853	173273	173729	174091	174527	174931	175453	175891
172859	173291	173741	174101	174533	174943	175463	175897
172867	173293	173743	174121	174569	174959	175481	175909
172871	173297	173773	174137	174571	174989	175493	175919
172877	173309	173777	174143	174583	174991	175499	175937
172883	173347	173779	174149	174599	175003	175519	175939
172933	173357	173783	174157	174613	175013	175523	175949
172969	173359	173807	174169	174617	175039	175543	175961
172973	173429	173819	174197	174631	175061	175573	175963
172981	173431	173827	174221	174637	175067	175601	175979
172987	173473	173839	174241	174649	175069	175621	175991
172993	173483	173851	174257	174653	175079	175631	175993
172999	173491	173861	174259	174659	175081	175633	176017

176021	176357	176711	177113	177589	178039	178447	178819
176023	176369	176713	177127	177601	178067	178469	178831
176041	176383	176741	177131	177623	178069	178481	178853
176047	176389	176747	177167	177647	178091	178487	178859
176051	176401	176753	177173	177677	178093	178489	178873
176053	176413	176777	177209	177679	178103	178501	178877
176063	176417	176779	177211	177691	178117	178513	178889
176081	176419	176789	177217	177739	178127	178531	178897
176087	176431	176791	177223	177743	178141	178537	178903
176089	176459	176797	177239	177761	178151	178559	178907
176123	176461	176807	177257	177763	178169	178561	178909
176129	176467	176809	177269	177787	178183	178567	178921
176153	176489	176819	177283	177791	178187	178571	178931
176159	176497	176849	177301	177797	178207	178597	178933
176161	176503	176857	177319	177811	178223	178601	178939
176179	176507	176887	177323	177823	178231	178603	178951
176191	176509	176899	177337	177839	178247	178609	178973
176201	176521	176903	177347	177841	178249	178613	178987
176207	176531	176921	177379	177883	178259	178621	179021
176213	176537	176923	177383	177887	178261	178627	179029
176221	176549	176927	177409	177889	178289	178639	179033
176227	176551	176933	177421	177893	178301	178643	179041
176237	176557	176951	177427	177907	178307	178681	179051
176243	176573	176977	177431	177913	178327	178691	179057
176261	176591	176983	177433	177917	178333	178693	179083
176299	176597	176989	177467	177929	178349	178697	179089
176303	176599	177007	177473	177943	178351	178753	179099
176317	176609	177011	177481	177949	178361	178757	179107
176321	176611	177013	177487	177953	178393	178781	179111
176327	176629	177019	177493	177967	178397	178793	179119
176329	176641	177043	177511	177979	178403	178799	179143
176333	176651	177091	177533	178001	178417	178807	179161
176347	176677	177101	177539	178021	178439	178813	179167
176353	176699	177109	177553	178037	178441	178817	179173

179203	179573	179923	180307	180751	181273	181739	182101
179209	179579	179939	180311	180773	181277	181751	182107
179213	179581	179947	180317	180779	181283	181757	182111
179233	179591	179951	180331	180793	181297	181759	182123
179243	179593	179953	180337	180797	181301	181763	182129
179261	179603	179957	180347	180799	181303	181777	182131
179269	179623	179969	180361	180811	181361	181787	182141
179281	179633	179981	180371	180847	181387	181789	182159
179287	179651	179989	180379	180871	181397	181813	182167
179317	179657	179999	180391	180883	181399	181837	182177
179321	179659	180001	180413	180907	181409	181871	182179
179327	179671	180007	180419	180949	181421	181873	182201
179351	179687	180023	180437	180959	181439	181889	182209
179357	179689	180043	180463	181001	181457	181891	182233
179369	179693	180053	180473	181003	181459	181903	182239
179381	179717	180071	180491	181019	181499	181913	182243
179383	179719	180073	180497	181031	181501	181919	182261
179393	179737	180077	180503	181039	181513	181927	182279
179407	179743	180097	180511	181061	181523	181931	182297
179411	179749	180137	180533	181063	181537	181943	182309
179429	179779	180161	180539	181081	181549	181957	182333
179437	179801	180179	180541	181087	181553	181967	182339
179441	179807	180181	180547	181123	181603	181981	182341
179453	179813	180211	180563	181141	181607	181997	182353
179461	179819	180221	180569	181157	181609	182009	182387
179471	179821	180233	180617	181183	181619	182011	182389
179479	179827	180239	180623	181193	181639	182027	182417
179483	179833	180241	180629	181199	181667	182029	182423
179497	179849	180247	180647	181201	181669	182041	182431
179519	179897	180259	180667	181211	181693	182047	182443
179527	179899	180263	180679	181213	181711	182057	182453
179533	179903	180281	180701	181219	181717	182059	182467
179549	179909	180287	180731	181243	181721	182089	182471
179563	179917	180289	180749	181253	181729	182099	182473

182489	182867	183317	183683	184111	184553	184967	185327
182503	182887	183319	183691	184117	184559	184969	185359
182509	182893	183329	183697	184133	184567	184993	185363
182519	182899	183343	183707	184153	184571	184997	185369
182537	182921	183349	183709	184157	184577	184999	185371
182549	182927	183361	183713	184181	184607	185021	185401
182561	182929	183373	183761	184187	184609	185027	185429
182579	182933	183377	183763	184189	184627	185051	185441
182587	182953	183383	183797	184199	184631	185057	185467
182593	182957	183389	183809	184211	184633	185063	185477
182599	182969	183397	183823	184231	184649	185069	185483
182603	182981	183437	183829	184241	184651	185071	185491
182617	182999	183439	183871	184259	184669	185077	185519
182627	183023	183451	183877	184271	184687	185089	185527
182639	183037	183461	183881	184273	184693	185099	185531
182641	183041	183473	183907	184279	184703	185123	185533
182653	183047	183479	183917	184291	184711	185131	185539
182657	183059	183487	183919	184309	184721	185137	185543
182659	183067	183497	183943	184321	184727	185149	185551
182681	183089	183499	183949	184333	184733	185153	185557
182687	183091	183503	183959	184337	184753	185161	185567
182701	183119	183509	183971	184351	184777	185167	185569
182711	183151	183511	183973	184369	184823	185177	185593
182713	183167	183523	183979	184409	184829	185183	185599
182747	183191	183527	184003	184417	184831	185189	185621
182773	183203	183569	184007	184441	184837	185221	185641
182779	183247	183571	184013	184447	184843	185233	185651
182789	183259	183577	184031	184463	184859	185243	185677
182803	183263	183581	184039	184477	184879	185267	185681
182813	183283	183587	184043	184487	184901	185291	185683
182821	183289	183593	184057	184489	184903	185299	185693
182839	183299	183611	184073	184511	184913	185303	185699
182851	183301	183637	184081	184517	184949	185309	185707
182857	183307	183661	184087	184523	184957	185323	185711

185723	186049	186469	186883	187277	187687	188179	188609
185737	186071	186479	186889	187303	187699	188189	188621
185747	186097	186481	186917	187337	187711	188197	188633
185749	186103	186551	186947	187339	187721	188249	188653
185753	186107	186569	186959	187349	187751	188261	188677
185767	186113	186581	187003	187361	187763	188273	188681
185789	186119	186583	187009	187367	187787	188281	188687
185797	186149	186587	187027	187373	187793	188291	188693
185813	186157	186601	187043	187379	187823	188299	188701
185819	186161	186619	187049	187387	187843	188303	188707
185821	186163	186629	187067	187393	187861	188311	188711
185831	186187	186647	187069	187409	187871	188317	188719
185833	186191	186649	187073	187417	187877	188323	188729
185849	186211	186653	187081	187423	187883	188333	188753
185869	186227	186671	187091	187433	187897	188351	188767
185873	186229	186679	187111	187441	187907	188359	188779
185893	186239	186689	187123	187463	187909	188369	188791
185897	186247	186701	187127	187469	187921	188389	188801
185903	186253	186707	187129	187471	187927	188401	188827
185917	186259	186709	187133	187477	187931	188407	188831
185923	186271	186727	187139	187507	187951	188417	188833
185947	186283	186733	187141	187513	187963	188431	188843
185951	186299	186743	187163	187531	187973	188437	188857
185957	186301	186757	187171	187547	187987	188443	188861
185959	186311	186761	187177	187559	188011	188459	188863
185971	186317	186763	187181	187573	188017	188473	188869
185987	186343	186773	187189	187597	188021	188483	188891
185993	186377	186793	187193	187631	188029	188491	188911
186007	186379	186799	187211	187633	188107	188519	188927
186013	186391	186841	187217	187637	188137	188527	188933
186019	186397	186859	187219	187639	188143	188533	188939
186023	186419	186869	187223	187651	188147	188563	188941
186037	186437	186871	187237	187661	188159	188579	188953
186041	186451	186877	187273	187669	188171	188603	188957

188983	189407	189767	190243	190657	191057	191507	191899
188999	189421	189797	190249	190667	191071	191509	191903
189011	189433	189799	190261	190669	191089	191519	191911
189017	189437	189817	190271	190699	191099	191531	191929
189019	189439	189823	190283	190709	191119	191533	191953
189041	189463	189851	190297	190711	191123	191537	191969
189043	189467	189853	190301	190717	191137	191551	191977
189061	189473	189859	190313	190753	191141	191561	191999
189067	189479	189877	190321	190759	191143	191563	192007
189127	189491	189881	190331	190763	191161	191579	192013
189139	189493	189887	190339	190769	191173	191599	192029
189149	189509	189901	190357	190783	191189	191621	192037
189151	189517	189913	190367	190787	191227	191627	192043
189169	189523	189929	190369	190793	191231	191657	192047
189187	189529	189947	190387	190807	191237	191669	192053
189199	189547	189949	190391	190811	191249	191671	192091
189223	189559	189961	190403	190823	191251	191677	192097
189229	189583	189967	190409	190829	191281	191689	192103
189239	189593	189977	190471	190837	191297	191693	192113
189251	189599	189983	190507	190843	191299	191699	192121
189253	189613	189989	190523	190871	191339	191707	192133
189257	189617	189997	190529	190889	191341	191717	192149
189271	189619	190027	190537	190891	191353	191747	192161
189307	189643	190031	190543	190901	191413	191749	192173
189311	189653	190051	190573	190909	191441	191773	192187
189337	189661	190063	190577	190913	191447	191783	192191
189347	189671	190093	190579	190921	191449	191791	192193
189349	189691	190097	190583	190979	191453	191801	192229
189353	189697	190121	190591	190997	191459	191803	192233
189361	189701	190129	190607	191021	191461	191827	192239
189377	189713	190147	190613	191027	191467	191831	192251
189389	189733	190159	190633	191033	191473	191833	192259
189391	189743	190181	190639	191039	191491	191837	192263
189401	189757	190207	190649	191047	191497	191861	192271

192307	192677	193051	193493	193873	194323	194813	195193
192317	192697	193057	193507	193877	194353	194819	195197
192319	192737	193073	193513	193883	194371	194827	195203
192323	192743	193093	193541	193891	194377	194839	195229
192341	192749	193133	193549	193937	194413	194861	195241
192343	192757	193139	193559	193939	194431	194863	195253
192347	192767	193147	193573	193943	194443	194867	195259
192373	192781	193153	193577	193951	194471	194869	195271
192377	192791	193163	193597	193957	194479	194891	195277
192383	192799	193181	193601	193979	194483	194899	195281
192391	192811	193183	193603	193993	194507	194911	195311
192407	192817	193189	193607	194003	194521	194917	195319
192431	192833	193201	193619	194017	194527	194933	195329
192461	192847	193243	193649	194027	194543	194963	195341
192463	192853	193247	193663	194057	194569	194977	195343
192497	192859	193261	193679	194069	194581	194981	195353
192499	192877	193283	193703	194071	194591	194989	195359
192529	192883	193301	193723	194083	194609	195023	195389
192539	192887	193327	193727	194087	194647	195029	195401
192547	192889	193337	193741	194093	194653	195043	195407
192553	192917	193357	193751	194101	194659	195047	195413
192557	192923	193367	193757	194113	194671	195049	195427
192571	192931	193373	193763	194119	194681	195053	195443
192581	192949	193379	193771	194141	194683	195071	195457
192583	192961	193381	193789	194149	194687	195077	195469
192587	192971	193387	193793	194167	194707	195089	195479
192601	192977	193393	193799	194179	194713	195103	195493
192611	192979	193423	193811	194197	194717	195121	195497
192613	192991	193433	193813	194203	194723	195127	195511
192617	193003	193441	193841	194239	194729	195131	195527
192629	193009	193447	193847	194263	194749	195137	195539
192631	193013	193451	193859	194267	194767	195157	195541
192637	193031	193463	193861	194269	194771	195161	195581
192667	193043	193469	193871	194309	194809	195163	195593

195599	196003	196477	196879	197293	197689	198091	198479
195659	196033	196499	196901	197297	197699	198097	198491
195677	196039	196501	196907	197299	197711	198109	198503
195691	196043	196519	196919	197311	197713	198127	198529
195697	196051	196523	196927	197339	197741	198139	198533
195709	196073	196541	196961	197341	197753	198173	198553
195731	196081	196543	196991	197347	197759	198179	198571
195733	196087	196549	196993	197359	197767	198193	198589
195737	196111	196561	197003	197369	197773	198197	198593
195739	196117	196579	197009	197371	197779	198221	198599
195743	196139	196583	197023	197381	197803	198223	198613
195751	196159	196597	197033	197383	197807	198241	198623
195761	196169	196613	197059	197389	197831	198251	198637
195781	196171	196643	197063	197419	197837	198257	198641
195787	196177	196657	197077	197423	197887	198259	198647
195791	196181	196661	197083	197441	197891	198277	198659
195809	196187	196663	197089	197453	197893	198281	198673
195817	196193	196681	197101	197479	197909	198301	198689
195863	196201	196687	197117	197507	197921	198313	198701
195869	196247	196699	197123	197521	197927	198323	198719
195883	196271	196709	197137	197539	197933	198337	198733
195887	196277	196717	197147	197551	197947	198347	198761
195893	196279	196727	197159	197567	197957	198349	198769
195907	196291	196739	197161	197569	197959	198377	198811
195913	196303	196751	197203	197573	197963	198391	198817
195919	196307	196769	197207	197597	197969	198397	198823
195929	196331	196771	197221	197599	197971	198409	198827
195931	196337	196799	197233	197609	198013	198413	198829
195967	196379	196817	197243	197621	198017	198427	198833
195971	196387	196831	197257	197641	198031	198437	198839
195973	196429	196837	197261	197647	198043	198439	198841
195977	196439	196853	197269	197651	198047	198461	198851
195991	196453	196871	197273	197677	198073	198463	198859
195997	196459	196873	197279	197683	198083	198469	198899

198901	199373	199753	200177	200609	201073	201511	201881
198929	199379	199777	200183	200639	201101	201517	201889
198937	199399	199783	200191	200657	201107	201547	201893
198941	199403	199799	200201	200671	201119	201557	201907
198943	199411	199807	200227	200689	201121	201577	201911
198953	199417	199811	200231	200699	201139	201581	201919
198959	199429	199813	200237	200713	201151	201589	201923
198967	199447	199819	200257	200723	201163	201599	201937
198971	199453	199831	200273	200731	201167	201611	201947
198977	199457	199853	200293	200771	201193	201623	201953
198997	199483	199873	200297	200779	201203	201629	201961
199021	199487	199877	200323	200789	201209	201653	201973
199033	199489	199889	200329	200797	201211	201661	201979
199037	199499	199909	200341	200807	201233	201667	201997
199039	199501	199921	200351	200843	201247	201673	202001
199049	199523	199931	200357	200861	201251	201683	202021
199081	199559	199933	200363	200867	201281	201701	202031
199103	199567	199961	200371	200869	201287	201709	202049
199109	199583	199967	200381	200881	201307	201731	202061
199151	199601	199999	200383	200891	201329	201743	202063
199153	199603	200003	200401	200899	201337	201757	202067
199181	199621	200009	200407	200903	201359	201767	202087
199193	199637	200017	200437	200909	201389	201769	202099
199207	199657	200023	200443	200927	201401	201781	202109
199211	199669	200029	200461	200929	201403	201787	202121
199247	199673	200033	200467	200971	201413	201791	202127
199261	199679	200041	200483	200983	201437	201797	202129
199267	199687	200063	200513	200987	201449	201809	202183
199289	199697	200087	200569	200989	201451	201821	202187
199313	199721	200117	200573	201007	201473	201823	202201
199321	199729	200131	200579	201011	201491	201827	202219
199337	199739	200153	200587	201031	201493	201829	202231
199343	199741	200159	200591	201037	201497	201833	202243
199357	199751	200171	200597	201049	201499	201847	202277

202289	202733	203207	203579	204007	204439	204887	205307
202291	202747	203209	203591	204013	204443	204913	205319
202309	202751	203213	203617	204019	204461	204917	205327
202327	202753	203221	203627	204023	204481	204923	205339
202339	202757	203227	203641	204047	204487	204931	205357
202343	202777	203233	203653	204059	204509	204947	205391
202357	202799	203249	203657	204067	204511	204973	205397
202361	202817	203279	203659	204101	204517	204979	205399
202381	202823	203293	203663	204107	204521	204983	205417
202387	202841	203309	203669	204133	204557	205019	205421
202393	202859	203311	203713	204137	204563	205031	205423
202403	202877	203317	203761	204143	204583	205033	205427
202409	202879	203321	203767	204151	204587	205043	205433
202441	202889	203323	203771	204161	204599	205063	205441
202471	202907	203339	203773	204163	204601	205069	205453
202481	202921	203341	203789	204173	204613	205081	205463
202493	202931	203351	203807	204233	204623	205097	205477
202519	202933	203353	203809	204251	204641	205103	205483
202529	202949	203363	203821	204299	204667	205111	205487
202549	202967	203381	203843	204301	204679	205129	205493
202567	202973	203383	203857	204311	204707	205133	205507
202577	202981	203387	203869	204319	204719	205141	205519
202591	202987	203393	203873	204329	204733	205151	205529
202613	202999	203417	203897	204331	204749	205157	205537
202621	203011	203419	203909	204353	204751	205171	205549
202627	203017	203429	203911	204359	204781	205187	205553
202637	203023	203431	203921	204361	204791	205201	205559
202639	203039	203449	203947	204367	204793	205211	205589
202661	203051	203459	203953	204371	204797	205213	205603
202667	203057	203461	203969	204377	204803	205223	205607
202679	203117	203531	203971	204397	204821	205237	205619
202693	203141	203549	203977	204427	204857	205253	205627
202717	203173	203563	203989	204431	204859	205267	205633
202729	203183	203569	203999	204437	204871	205297	205651

205657	206083	206467	206933	207343	207679	208121	208493
205661	206123	206477	206939	207367	207709	208129	208499
205663	206153	206483	206951	207371	207719	208139	208501
205703	206177	206489	206953	207377	207721	208141	208511
205721	206179	206501	206993	207401	207743	208147	208513
205759	206183	206519	207013	207409	207763	208189	208519
205763	206191	206527	207017	207433	207769	208207	208529
205783	206197	206543	207029	207443	207797	208213	208553
205817	206203	206551	207037	207457	207799	208217	208577
205823	206209	206593	207041	207463	207811	208223	208589
205837	206221	206597	207061	207469	207821	208231	208591
205847	206233	206603	207073	207479	207833	208253	208609
205879	206237	206623	207079	207481	207847	208261	208627
205883	206249	206627	207113	207491	207869	208277	208631
205913	206251	206639	207121	207497	207877	208279	208657
205937	206263	206641	207127	207509	207923	208283	208667
205949	206273	206651	207139	207511	207931	208291	208673
205951	206279	206699	207169	207517	207941	208309	208687
205957	206281	206749	207187	207521	207947	208319	208697
205963	206291	206779	207191	207523	207953	208333	208699
205967	206299	206783	207197	207541	207967	208337	208721
205981	206303	206803	207199	207547	207971	208367	208729
205991	206341	206807	207227	207551	207973	208379	208739
205993	206347	206813	207239	207563	207997	208387	208759
206009	206351	206819	207241	207569	208001	208391	208787
206021	206369	206821	207257	207589	208003	208393	208799
206027	206383	206827	207269	207593	208009	208409	208807
206033	206399	206879	207287	207619	208037	208433	208837
206039	206407	206887	207293	207629	208049	208441	208843
206047	206411	206897	207301	207643	208057	208457	208877
206051	206413	206909	207307	207653	208067	208459	208889
206069	206419	206911	207329	207661	208073	208463	208891
206077	206447	206917	207331	207671	208099	208469	208907
206081	206461	206923	207341	207673	208111	208489	208927

208931	209333	209707	210101	210437	210901	211283	211693
208933	209347	209717	210109	210461	210907	211291	211711
208961	209353	209719	210113	210467	210911	211297	211723
208963	209357	209743	210127	210481	210913	211313	211727
208991	209359	209767	210131	210487	210923	211319	211741
208993	209371	209771	210139	210491	210929	211333	211747
208997	209381	209789	210143	210499	210943	211339	211777
209021	209393	209801	210157	210523	210961	211349	211781
209029	209401	209809	210169	210527	210967	211369	211789
209039	209431	209813	210173	210533	211007	211373	211801
209063	209441	209819	210187	210557	211039	211403	211811
209071	209449	209821	210191	210599	211049	211427	211817
209089	209459	209837	210193	210601	211051	211433	211859
209123	209471	209851	210209	210619	211061	211441	211867
209147	209477	209857	210229	210631	211063	211457	211873
209159	209497	209861	210233	210643	211067	211469	211877
209173	209519	209887	210241	210659	211073	211493	211879
209179	209533	209917	210247	210671	211093	211499	211889
209189	209543	209927	210257	210709	211097	211501	211891
209201	209549	209929	210263	210713	211129	211507	211927
209203	209563	209939	210277	210719	211151	211543	211931
209213	209567	209953	210283	210731	211153	211559	211933
209221	209569	209959	210299	210739	211177	211571	211943
209227	209579	209971	210317	210761	211187	211573	211949
209233	209581	209977	210319	210773	211193	211583	211969
209249	209597	209983	210323	210803	211199	211597	211979
209257	209621	209987	210347	210809	211213	211619	211997
209263	209623	210011	210359	210811	211217	211639	212029
209267	209639	210019	210361	210823	211219	211643	212039
209269	209647	210031	210391	210827	211229	211657	212057
209299	209659	210037	210401	210839	211231	211661	212081
209311	209669	210053	210403	210853	211241	211663	212099
209317	209687	210071	210407	210857	211247	211681	212117
209327	209701	210097	210421	210869	211271	211691	212123

212131	212627	213091	213467	213943	214309	214723	215179
212141	212633	213097	213481	213947	214351	214729	215183
212161	212651	213119	213491	213949	214363	214733	215191
212167	212669	213131	213523	213953	214373	214741	215197
212183	212671	213133	213533	213973	214381	214759	215239
212203	212677	213139	213539	213977	214391	214763	215249
212207	212683	213149	213553	213989	214399	214771	215261
212209	212701	213173	213557	214003	214433	214783	215273
212227	212777	213181	213589	214007	214439	214787	215279
212239	212791	213193	213599	214009	214451	214789	215297
212243	212801	213203	213611	214021	214457	214807	215309
212281	212827	213209	213613	214031	214463	214811	215317
212293	212837	213217	213623	214033	214469	214817	215329
212297	212843	213223	213637	214043	214481	214831	215351
212353	212851	213229	213641	214051	214483	214849	215353
212369	212867	213247	213649	214063	214499	214853	215359
212383	212869	213253	213659	214069	214507	214867	215381
212411	212873	213263	213713	214087	214517	214883	215389
212419	212881	213281	213721	214091	214519	214891	215393
212423	212897	213287	213727	214129	214531	214913	215399
212437	212903	213289	213737	214133	214541	214939	215417
212447	212909	213307	213751	214141	214559	214943	215443
212453	212917	213319	213791	214147	214561	214967	215447
212461	212923	213329	213799	214163	214589	214987	215459
212467	212969	213337	213821	214177	214603	214993	215461
212479	212981	213349	213827	214189	214607	215051	215471
212501	212987	213359	213833	214211	214631	215063	215483
212507	212999	213361	213847	214213	214639	215077	215497
212557	213019	213383	213859	214219	214651	215087	215503
212561	213023	213391	213881	214237	214657	215123	215507
212573	213029	213397	213887	214243	214663	215141	215521
212579	213043	213407	213901	214259	214667	215143	215531
212587	213067	213449	213919	214283	214673	215153	215563
212593	213079	213461	213929	214297	214691	215161	215573

215587	216071	216551	216919	217351	217739	218213	218629
215617	216091	216553	216947	217361	217747	218227	218641
215653	216103	216569	216967	217363	217771	218233	218651
215659	216107	216571	216973	217367	217781	218249	218657
215681	216113	216577	216991	217369	217793	218279	218677
215687	216119	216607	217001	217387	217823	218287	218681
215689	216127	216617	217003	217397	217829	218357	218711
215693	216133	216641	217027	217409	217849	218363	218717
215723	216149	216647	217033	217411	217859	218371	218719
215737	216157	216649	217057	217421	217901	218381	218723
215753	216173	216653	217069	217429	217907	218389	218737
215767	216179	216661	217081	217439	217909	218401	218749
215771	216211	216679	217111	217457	217933	218417	218761
215797	216217	216703	217117	217463	217937	218419	218783
215801	216233	216719	217121	217489	217969	218423	218797
215827	216259	216731	217157	217499	217979	218437	218809
215833	216263	216743	217163	217517	217981	218447	218819
215843	216289	216751	217169	217519	218003	218453	218833
215851	216317	216757	217199	217559	218021	218459	218839
215857	216319	216761	217201	217561	218047	218461	218843
215863	216329	216779	217207	217573	218069	218479	218849
215893	216347	216781	217219	217577	218077	218509	218857
215899	216371	216787	217223	217579	218081	218513	218873
215909	216373	216791	217229	217619	218083	218521	218887
215921	216379	216803	217241	217643	218087	218527	218923
215927	216397	216829	217253	217661	218107	218531	218941
215939	216401	216841	217271	217667	218111	218549	218947
215953	216421	216851	217307	217681	218117	218551	218963
215959	216431	216859	217309	217687	218131	218579	218969
215981	216451	216877	217313	217691	218137	218591	218971
215983	216481	216899	217319	217697	218143	218599	218987
216023	216493	216901	217333	217717	218149	218611	218989
216037	216509	216911	217337	217727	218171	218623	218993
216061	216523	216917	217339	217733	218191	218627	219001

219017	219451	219799	220177	220663	221059	221471	221873
219019	219463	219809	220189	220667	221069	221477	221891
219031	219467	219823	220217	220673	221071	221489	221909
219041	219491	219829	220243	220681	221077	221497	221941
219053	219503	219839	220279	220687	221083	221509	221951
219059	219517	219847	220291	220699	221087	221537	221953
219071	219523	219851	220301	220709	221093	221539	221957
219083	219529	219871	220307	220721	221101	221549	221987
219091	219533	219881	220327	220747	221159	221567	221989
219097	219547	219889	220333	220757	221171	221581	221999
219103	219577	219911	220351	220771	221173	221587	222007
219119	219587	219917	220357	220783	221197	221603	222011
219133	219599	219931	220361	220789	221201	221621	222023
219143	219607	219937	220369	220793	221203	221623	222029
219169	219613	219941	220373	220807	221209	221653	222041
219187	219619	219943	220391	220811	221219	221657	222043
219217	219629	219953	220399	220841	221227	221659	222059
219223	219647	219959	220403	220859	221233	221671	222067
219251	219649	219971	220411	220861	221239	221677	222073
219277	219677	219977	220421	220873	221251	221707	222107
219281	219679	219979	220447	220877	221261	221713	222109
219293	219683	219983	220469	220879	221281	221717	222113
219301	219689	220009	220471	220889	221303	221719	222127
219311	219707	220013	220511	220897	221311	221723	222137
219313	219721	220019	220513	220901	221317	221729	222149
219353	219727	220021	220529	220903	221327	221737	222151
219361	219731	220057	220537	220907	221393	221747	222161
219371	219749	220063	220543	220919	221399	221773	222163
219377	219757	220123	220553	220931	221401	221797	222193
219389	219761	220141	220559	220933	221411	221807	222197
219407	219763	220147	220573	220939	221413	221813	222199
219409	219767	220151	220579	220973	221447	221827	222247
219433	219787	220163	220589	221021	221453	221831	222269
219437	219797	220169	220613	221047	221461	221849	222289

222293	222773	223129	223493	223999	224363	224813	225223
222311	222779	223133	223507	224011	224401	224831	225227
222317	222787	223151	223529	224027	224423	224863	225241
222323	222791	223207	223543	224033	224429	224869	225257
222329	222793	223211	223547	224041	224443	224881	225263
222337	222799	223217	223549	224047	224449	224891	225287
222347	222823	223219	223577	224057	224461	224897	225289
222349	222839	223229	223589	224069	224467	224909	225299
222361	222841	223241	223621	224071	224473	224911	225307
222367	222857	223243	223633	224101	224491	224921	225341
222379	222863	223247	223637	224113	224501	224929	225343
222389	222877	223253	223667	224129	224513	224947	225347
222403	222883	223259	223679	224131	224527	224951	225349
222419	222913	223273	223681	224149	224563	224969	225353
222437	222919	223277	223697	224153	224569	224977	225371
222461	222931	223283	223711	224171	224579	224993	225373
222493	222941	223291	223747	224177	224591	225023	225383
222499	222947	223303	223753	224197	224603	225037	225427
222511	222953	223313	223757	224201	224611	225061	225431
222527	222967	223319	223759	224209	224617	225067	225457
222533	222977	223331	223781	224221	224629	225077	225461
222553	222979	223337	223823	224233	224633	225079	225479
222557	222991	223339	223829	224239	224669	225089	225493
222587	223007	223361	223831	224251	224677	225109	225499
222601	223009	223367	223837	224261	224683	225119	225503
222613	223019	223381	223841	224267	224699	225133	225509
222619	223037	223403	223843	224291	224711	225143	225523
222643	223049	223423	223849	224299	224717	225149	225527
222647	223051	223429	223903	224303	224729	225157	225529
222659	223061	223439	223919	224309	224737	225161	225569
222679	223063	223441	223921	224317	224743	225163	225581
222707	223087	223463	223939	224327	224759	225167	225583
222713	223099	223469	223963	224351	224771	225217	225601
222731	223103	223481	223969	224359	224797	225221	225611

225613	226013	226483	226903	227377	227693	228223	228587
225619	226027	226487	226907	227387	227699	228233	228593
225629	226063	226511	226913	227393	227707	228251	228601
225637	226087	226531	226937	227399	227719	228257	228611
225671	226099	226547	226943	227407	227729	228281	228617
225683	226103	226549	226991	227419	227743	228299	228619
225689	226123	226553	227011	227431	227789	228301	228637
225697	226129	226571	227027	227453	227797	228307	228647
225721	226133	226601	227053	227459	227827	228311	228677
225733	226141	226609	227081	227467	227849	228331	228707
225749	226169	226621	227089	227471	227869	228337	228713
225751	226183	226631	227093	227473	227873	228341	228731
225767	226189	226637	227111	227489	227893	228353	228733
225769	226199	226643	227113	227497	227947	228359	228737
225779	226201	226649	227131	227501	227951	228383	228751
225781	226217	226657	227147	227519	227977	228409	228757
225809	226231	226663	227153	227531	227989	228419	228773
225821	226241	226669	227159	227533	227993	228421	228793
225829	226267	226691	227167	227537	228013	228427	228797
225839	226283	226697	227177	227561	228023	228443	228799
225859	226307	226741	227189	227567	228049	228451	228829
225871	226313	226753	227191	227569	228061	228457	228841
225889	226337	226769	227207	227581	228077	228461	228847
225919	226357	226777	227219	227593	228097	228469	228853
225931	226367	226783	227231	227597	228103	228479	228859
225941	226379	226789	227233	227603	228113	228509	228869
225943	226381	226799	227251	227609	228127	228511	228881
225949	226397	226813	227257	227611	228131	228517	228883
225961	226409	226817	227267	227627	228139	228521	228887
225977	226427	226819	227281	227629	228181	228523	228901
225983	226433	226823	227299	227651	228197	228539	228911
225989	226451	226843	227303	227653	228199	228559	228913
226001	226453	226871	227363	227663	228203	228577	228923
226007	226463	226901	227371	227671	228211	228581	228929

228953	229373	229739	230107	230471	230933	231367	231809
228959	229393	229751	230117	230479	230939	231379	231821
228961	229399	229753	230123	230501	230941	231409	231823
228983	229403	229759	230137	230507	230959	231419	231827
228989	229409	229763	230143	230539	230969	231431	231839
229003	229423	229769	230149	230551	230977	231433	231841
229027	229433	229771	230189	230561	230999	231443	231859
229037	229459	229777	230203	230563	231001	231461	231871
229081	229469	229781	230213	230567	231017	231463	231877
229093	229487	229799	230221	230597	231019	231479	231893
229123	229499	229813	230227	230611	231031	231481	231901
229127	229507	229819	230233	230647	231041	231493	231919
229133	229519	229837	230239	230653	231053	231503	231923
229139	229529	229841	230257	230663	231067	231529	231943
229153	229547	229847	230273	230683	231079	231533	231947
229157	229549	229849	230281	230693	231107	231547	231961
229171	229553	229897	230291	230719	231109	231551	231967
229181	229561	229903	230303	230729	231131	231559	232003
229189	229583	229937	230309	230743	231169	231563	232007
229199	229589	229939	230311	230761	231197	231571	232013
229213	229591	229949	230327	230767	231223	231589	232049
229217	229601	229961	230339	230771	231241	231599	232051
229223	229613	229963	230341	230773	231269	231607	232073
229237	229627	229979	230353	230779	231271	231611	232079
229247	229631	229981	230357	230807	231277	231613	232081
229249	229637	230003	230369	230819	231289	231631	232091
229253	229639	230017	230383	230827	231293	231643	232103
229261	229681	230047	230387	230833	231299	231661	232109
229267	229693	230059	230389	230849	231317	231677	232117
229283	229699	230063	230393	230861	231323	231701	232129
229309	229703	230077	230431	230863	231331	231709	232153
229321	229711	230081	230449	230873	231347	231719	232171
229343	229717	230089	230453	230891	231349	231779	232187
229351	229727	230101	230467	230929	231359	231799	232189

232207	232681	233161	233617	234103	234473	234863	235273
232217	232699	233173	233621	234121	234499	234869	235289
232259	232709	233183	233641	234131	234511	234893	235307
232303	232711	233201	233663	234139	234527	234907	235309
232307	232741	233221	233669	234149	234529	234917	235337
232333	232751	233231	233683	234161	234539	234931	235349
232357	232753	233239	233687	234167	234541	234947	235369
232363	232777	233251	233689	234181	234547	234959	235397
232367	232801	233267	233693	234187	234571	234961	235439
232381	232811	233279	233713	234191	234587	234967	235441
232391	232819	233293	233743	234193	234589	234977	235447
232409	232823	233297	233747	234197	234599	234979	235483
232411	232847	233323	233759	234203	234613	234989	235489
232417	232853	233327	233777	234211	234629	235003	235493
232433	232861	233329	233837	234217	234653	235007	235513
232439	232871	233341	233851	234239	234659	235009	235519
232451	232877	233347	233861	234259	234673	235013	235523
232457	232891	233353	233879	234271	234683	235043	235537
232459	232901	233357	233881	234281	234713	235051	235541
232487	232907	233371	233911	234287	234721	235057	235553
232499	232919	233407	233917	234293	234727	235069	235559
232513	232937	233417	233921	234317	234733	235091	235577
232523	232961	233419	233923	234319	234743	235099	235591
232549	232963	233423	233939	234323	234749	235111	235601
232567	232987	233437	233941	234331	234769	235117	235607
232571	233021	233477	233969	234341	234781	235159	235621
232591	233069	233489	233983	234343	234791	235171	235661
232597	233071	233509	233993	234361	234799	235177	235663
232607	233083	233549	234007	234383	234803	235181	235673
232621	233113	233551	234029	234431	234809	235199	235679
232633	233117	233557	234043	234457	234811	235211	235699
232643	233141	233591	234067	234461	234833	235231	235723
232663	233143	233599	234083	234463	234847	235241	235747
232669	233159	233609	234089	234467	234851	235243	235751

235783	236231	236701	237091	237607	238031	238373	238829
235787	236261	236707	237137	237619	238037	238397	238837
235789	236287	236713	237143	237631	238039	238417	238841
235793	236293	236723	237151	237673	238079	238423	238853
235811	236297	236729	237157	237683	238081	238439	238859
235813	236323	236737	237161	237689	238093	238451	238877
235849	236329	236749	237163	237691	238099	238463	238879
235871	236333	236771	237173	237701	238103	238471	238883
235877	236339	236773	237179	237707	238109	238477	238897
235889	236377	236779	237203	237733	238141	238481	238919
235891	236381	236783	237217	237737	238151	238499	238921
235901	236387	236807	237233	237749	238157	238519	238939
235919	236399	236813	237257	237763	238159	238529	238943
235927	236407	236867	237271	237767	238163	238531	238949
235951	236429	236869	237277	237781	238171	238547	238967
235967	236449	236879	237283	237791	238181	238573	238991
235979	236461	236881	237287	237821	238201	238591	239017
235997	236471	236891	237301	237851	238207	238627	239023
236017	236477	236893	237313	237857	238213	238639	239027
236021	236479	236897	237319	237859	238223	238649	239053
236053	236503	236909	237331	237877	238229	238657	239069
236063	236507	236917	237343	237883	238237	238673	239081
236069	236519	236947	237361	237901	238247	238681	239087
236077	236527	236981	237373	237911	238261	238691	239119
236087	236549	236983	237379	237929	238267	238703	239137
236107	236563	236993	237401	237959	238291	238709	239147
236111	236573	237011	237409	237967	238307	238723	239167
236129	236609	237019	237467	237971	238313	238727	239171
236143	236627	237043	237487	237973	238321	238729	239179
236153	236641	237053	237509	237977	238331	238747	239201
236167	236653	237067	237547	237997	238339	238759	239231
236207	236659	237071	237563	238001	238361	238781	239233
236209	236681	237073	237571	238009	238363	238789	239237
236219	236699	237089	237581	238019	238369	238801	239243

239251	239671	240059	240509	240943	241337	241727	242101
239263	239689	240073	240517	240953	241343	241739	242119
239273	239699	240089	240551	240959	241361	241771	242129
239287	239711	240101	240571	240967	241363	241781	242147
239297	239713	240109	240587	240997	241391	241783	242161
239329	239731	240113	240589	241013	241393	241793	242171
239333	239737	240131	240599	241027	241421	241807	242173
239347	239753	240139	240607	241037	241429	241811	242197
239357	239779	240151	240623	241049	241441	241817	242201
239383	239783	240169	240631	241051	241453	241823	242227
239387	239803	240173	240641	241061	241463	241847	242243
239389	239807	240197	240659	241067	241469	241861	242257
239417	239831	240203	240677	241069	241489	241867	242261
239423	239843	240209	240701	241079	241511	241873	242273
239429	239849	240257	240707	241093	241513	241877	242279
239431	239851	240259	240719	241117	241517	241883	242309
239441	239857	240263	240727	241127	241537	241903	242329
239461	239873	240271	240733	241141	241543	241907	242357
239489	239879	240283	240739	241169	241559	241919	242371
239509	239893	240287	240743	241177	241561	241921	242377
239521	239929	240319	240763	241183	241567	241931	242393
239527	239933	240341	240769	241207	241589	241939	242399
239531	239947	240347	240797	241229	241597	241951	242413
239539	239957	240349	240811	241249	241601	241963	242419
239543	239963	240353	240829	241253	241603	241973	242441
239557	239977	240371	240841	241259	241639	241979	242447
239567	239999	240379	240853	241261	241643	241981	242449
239579	240007	240421	240859	241271	241651	241993	242453
239587	240011	240433	240869	241291	241663	242009	242467
239597	240017	240437	240881	241303	241667	242057	242479
239611	240041	240473	240883	241313	241679	242059	242483
239623	240043	240479	240893	241321	241687	242069	242491
239633	240047	240491	240899	241327	241691	242083	242509
239641	240049	240503	240913	241333	241711	242093	242519

242521	242989	243437	243851	244297	244633	245039	245513
242533	242999	243461	243857	244301	244637	245071	245519
242551	243011	243469	243863	244303	244639	245083	245521
242591	243031	243473	243871	244313	244667	245087	245527
242603	243073	243479	243889	244333	244669	245107	245533
242617	243077	243487	243911	244339	244687	245129	245561
242621	243091	243517	243917	244351	244691	245131	245563
242629	243101	243521	243931	244357	244703	245149	245587
242633	243109	243527	243953	244367	244711	245171	245591
242639	243119	243533	243973	244379	244721	245173	245593
242647	243121	243539	243989	244381	244733	245177	245621
242659	243137	243553	244003	244393	244747	245183	245627
242677	243149	243577	244009	244399	244753	245209	245629
242681	243157	243583	244021	244403	244759	245251	245639
242689	243161	243587	244033	244411	244781	245257	245653
242713	243167	243589	244043	244423	244787	245261	245671
242729	243197	243613	244087	244429	244813	245269	245681
242731	243203	243623	244091	244451	244837	245279	245683
242747	243209	243631	244109	244457	244841	245291	245711
242773	243227	243643	244121	244463	244843	245299	245719
242779	243233	243647	244129	244471	244859	245317	245723
242789	243239	243671	244141	244481	244861	245321	245741
242797	243259	243673	244147	244493	244873	245339	245747
242807	243263	243701	244157	244507	244877	245383	245753
242813	243301	243703	244159	244529	244889	245389	245759
242819	243311	243707	244177	244547	244897	245407	245771
242863	243343	243709	244199	244553	244901	245411	245783
242867	243367	243769	244217	244561	244939	245417	245789
242873	243391	243781	244219	244567	244943	245419	245821
242887	243401	243787	244243	244583	244957	245437	245849
242911	243403	243799	244247	244589	244997	245471	245851
242923	243421	243809	244253	244597	245023	245473	245863
242927	243431	243829	244261	244603	245029	245477	245881
242971	243433	243839	244291	244619	245033	245501	245897

245899	246319	246739	247183	247603	247997	248357	248753
245909	246329	246769	247193	247607	247999	248371	248779
245911	246343	246773	247201	247609	248021	248389	248783
245941	246349	246781	247223	247613	248033	248401	248789
245963	246361	246787	247229	247633	248041	248407	248797
245977	246371	246793	247241	247649	248051	248431	248813
245981	246391	246803	247249	247651	248057	248441	248821
245983	246403	246809	247259	247691	248063	248447	248827
245989	246439	246811	247279	247693	248071	248461	248839
246011	246469	246817	247301	247697	248077	248473	248851
246017	246473	246833	247309	247711	248089	248477	248861
246049	246497	246839	247337	247717	248099	248483	248867
246073	246509	246889	247339	247729	248117	248509	248869
246097	246511	246899	247343	247739	248119	248533	248879
246119	246523	246907	247363	247759	248137	248537	248887
246121	246527	246913	247369	247769	248141	248543	248891
246131	246539	246919	247381	247771	248161	248569	248893
246133	246557	246923	247391	247781	248167	248579	248903
246151	246569	246929	247393	247799	248177	248587	248909
246167	246577	246931	247409	247811	248179	248593	248971
246173	246599	246937	247421	247813	248189	248597	248981
246187	246607	246941	247433	247829	248201	248609	248987
246193	246611	246947	247439	247847	248203	248621	249017
246203	246613	246971	247451	247853	248231	248627	249037
246209	246637	246979	247463	247873	248243	248639	249059
246217	246641	247001	247501	247879	248257	248641	249079
246223	246643	247007	247519	247889	248267	248657	249089
246241	246661	247031	247529	247901	248291	248683	249097
246247	246683	247067	247531	247913	248293	248701	249103
246251	246689	247069	247547	247939	248299	248707	249107
246271	246707	247073	247553	247943	248309	248719	249127
246277	246709	247087	247579	247957	248317	248723	249131
246289	246713	247099	247591	247991	248323	248737	249133
246317	246731	247141	247601	247993	248351	248749	249143

249181	249563	250007	250543	250969	251323	251707	252163
249187	249583	250013	250583	250979	251347	251737	252169
249199	249589	250027	250619	250993	251353	251761	252173
249211	249593	250031	250643	251003	251359	251789	252181
249217	249607	250037	250673	251033	251387	251791	252193
249229	249647	250043	250681	251051	251393	251809	252209
249233	249659	250049	250687	251057	251417	251831	252223
249253	249671	250051	250693	251059	251429	251833	252233
249257	249677	250057	250703	251063	251431	251843	252253
249287	249703	250073	250709	251071	251437	251857	252277
249311	249721	250091	250721	251081	251443	251861	252283
249317	249727	250109	250727	251087	251467	251879	252289
249329	249737	250123	250739	251099	251473	251887	252293
249341	249749	250147	250741	251117	251477	251893	252313
249367	249763	250153	250751	251143	251483	251897	252319
249377	249779	250169	250753	251149	251491	251903	252323
249383	249797	250199	250777	251159	251501	251917	252341
249397	249811	250253	250787	251171	251513	251939	252359
249419	249827	250259	250793	251177	251519	251941	252383
249421	249833	250267	250799	251179	251527	251947	252391
249427	249853	250279	250807	251191	251533	251969	252401
249433	249857	250301	250813	251197	251539	251971	252409
249437	249859	250307	250829	251201	251543	251983	252419
249439	249863	250343	250837	251203	251561	252001	252431
249449	249871	250361	250841	251219	251567	252013	252443
249463	249881	250403	250853	251221	251609	252017	252449
249497	249911	250409	250867	251231	251611	252029	252457
249499	249923	250423	250871	251233	251621	252037	252463
249503	249943	250433	250889	251257	251623	252079	252481
249517	249947	250441	250919	251261	251639	252101	252509
249521	249967	250451	250949	251263	251653	252139	252533
249533	249971	250489	250951	251287	251663	252143	252541
249539	249973	250499	250963	251291	251677	252151	252559
249541	249989	250501	250967	251297	251701	252157	252583

252589	253013	253531	253879	254291	254803	255137	255551
252607	253049	253537	253901	254299	254827	255149	255571
252611	253063	253543	253907	254329	254831	255173	255587
252617	253081	253553	253909	254369	254833	255179	255589
252641	253103	253567	253919	254377	254857	255181	255613
252667	253109	253573	253937	254383	254869	255191	255617
252691	253133	253601	253949	254389	254873	255193	255637
252709	253153	253607	253951	254407	254879	255197	255641
252713	253157	253609	253969	254413	254887	255209	255649
252727	253159	253613	253987	254437	254899	255217	255653
252731	253229	253633	253993	254447	254911	255239	255659
252737	253243	253637	253999	254461	254927	255247	255667
252761	253247	253639	254003	254489	254929	255251	255679
252767	253273	253651	254021	254491	254941	255253	255709
252779	253307	253661	254027	254519	254959	255259	255713
252817	253321	253679	254039	254537	254963	255313	255733
252823	253343	253681	254041	254557	254971	255329	255743
252827	253349	253703	254047	254593	254977	255349	255757
252829	253361	253717	254053	254623	254987	255361	255763
252869	253367	253733	254071	254627	254993	255371	255767
252877	253369	253741	254083	254647	255007	255383	255803
252881	253381	253751	254119	254659	255019	255413	255839
252887	253387	253763	254141	254663	255023	255419	255841
252893	253417	253769	254147	254699	255043	255443	255847
252899	253423	253777	254161	254713	255049	255457	255851
252911	253427	253787	254179	254729	255053	255467	255859
252913	253433	253789	254197	254731	255071	255469	255869
252919	253439	253801	254207	254741	255077	255473	255877
252937	253447	253811	254209	254747	255083	255487	255887
252949	253469	253819	254213	254753	255097	255499	255907
252971	253481	253823	254249	254773	255107	255503	255917
252979	253493	253853	254257	254777	255121	255511	255919
252983	253501	253867	254279	254783	255127	255517	255923
253003	253507	253871	254281	254791	255133	255523	255947

255961	256391	256877	257321	257783	258173	258581	258977
255971	256393	256889	257339	257791	258197	258607	258983
255973	256423	256901	257351	257797	258211	258611	258991
255977	256441	256903	257353	257837	258233	258613	259001
255989	256469	256931	257371	257857	258241	258617	259009
256019	256471	256939	257381	257861	258253	258623	259019
256021	256483	256957	257399	257863	258277	258631	259033
256031	256489	256967	257401	257867	258283	258637	259099
256033	256493	256981	257407	257869	258299	258659	259121
256049	256499	257003	257437	257879	258317	258673	259123
256057	256517	257017	257443	257893	258319	258677	259151
256079	256541	257053	257447	257903	258329	258691	259157
256093	256561	257069	257459	257921	258331	258697	259159
256117	256567	257077	257473	257947	258337	258703	259163
256121	256577	257093	257489	257953	258353	258707	259169
256129	256579	257099	257497	257981	258373	258721	259177
256133	256589	257107	257501	257987	258389	258733	259183
256147	256603	257123	257503	257989	258403	258737	259201
256163	256609	257141	257519	257993	258407	258743	259211
256169	256639	257161	257539	258019	258413	258763	259213
256181	256643	257171	257561	258023	258421	258779	259219
256187	256651	257177	257591	258031	258437	258787	259229
256189	256661	257189	257611	258061	258443	258803	259271
256199	256687	257219	257627	258067	258449	258809	259277
256211	256699	257221	257639	258101	258469	258827	259309
256219	256721	257239	257657	258107	258487	258847	259321
256279	256723	257249	257671	258109	258491	258871	259339
256301	256757	257263	257687	258113	258499	258887	259379
256307	256771	257273	257689	258119	258521	258917	259381
256313	256799	257281	257707	258127	258527	258919	259387
256337	256801	257287	257711	258131	258539	258949	259397
256349	256813	257293	257713	258143	258551	258959	259411
256363	256831	257297	257717	258157	258563	258967	259421
256369	256873	257311	257731	258161	258569	258971	259429

259451	259837	260339	260761	261223	261637	262121	262519
259453	259841	260363	260773	261229	261641	262127	262541
259459	259867	260387	260791	261241	261643	262133	262543
259499	259907	260399	260807	261251	261673	262139	262553
259507	259933	260411	260809	261271	261697	262147	262567
259517	259937	260413	260849	261281	261707	262151	262583
259531	259943	260417	260857	261301	261713	262153	262597
259537	259949	260419	260861	261323	261721	262187	262621
259547	259967	260441	260863	261329	261739	262193	262627
259577	259991	260453	260873	261337	261757	262217	262643
259583	259993	260461	260879	261347	261761	262231	262649
259603	260003	260467	260893	261353	261773	262237	262651
259619	260009	260483	260921	261379	261787	262253	262657
259621	260011	260489	260941	261389	261791	262261	262681
259627	260017	260527	260951	261407	261799	262271	262693
259631	260023	260539	260959	261427	261823	262303	262697
259639	260047	260543	260969	261431	261847	262313	262709
259643	260081	260549	260983	261433	261881	262321	262723
259657	260089	260551	260987	261439	261887	262331	262733
259667	260111	260569	260999	261451	261917	262337	262739
259681	260137	260573	261011	261463	261959	262349	262741
259691	260171	260581	261013	261467	261971	262351	262747
259697	260179	260587	261017	261509	261973	262369	262781
259717	260189	260609	261031	261523	261977	262387	262783
259723	260191	260629	261043	261529	261983	262391	262807
259733	260201	260647	261059	261557	262007	262399	262819
259751	260207	260651	261061	261563	262027	262411	262853
259771	260209	260671	261071	261577	262049	262433	262877
259781	260213	260677	261077	261581	262051	262459	262883
259783	260231	260713	261089	261587	262069	262469	262897
259801	260263	260717	261101	261593	262079	262489	262901
259813	260269	260723	261127	261601	262103	262501	262909
259823	260317	260747	261167	261619	262109	262511	262937
259829	260329	260753	261169	261631	262111	262513	262949

262957	263399	263821	264169	264659	265079	265483	265883
262981	263401	263827	264179	264697	265091	265493	265891
263009	263411	263843	264211	264731	265093	265511	265921
263023	263423	263849	264221	264739	265117	265513	265957
263047	263429	263863	264263	264743	265123	265541	265961
263063	263437	263867	264269	264749	265129	265543	265987
263071	263443	263869	264283	264757	265141	265547	266003
263077	263489	263881	264289	264763	265151	265561	266009
263083	263491	263899	264301	264769	265157	265567	266023
263089	263503	263909	264323	264779	265163	265571	266027
263101	263513	263911	264331	264787	265169	265579	266029
263111	263519	263927	264343	264791	265193	265607	266047
263119	263521	263933	264349	264793	265207	265613	266051
263129	263533	263941	264353	264811	265231	265619	266053
263167	263537	263951	264359	264827	265241	265621	266059
263171	263561	263953	264371	264829	265247	265703	266081
263183	263567	263957	264391	264839	265249	265709	266083
263191	263573	263983	264403	264871	265261	265711	266089
263201	263591	264007	264437	264881	265271	265717	266093
263209	263597	264013	264443	264889	265273	265729	266099
263213	263609	264029	264463	264893	265277	265739	266111
263227	263611	264031	264487	264899	265313	265747	266117
263239	263621	264053	264527	264919	265333	265757	266129
263257	263647	264059	264529	264931	265337	265781	266137
263267	263651	264071	264553	264949	265339	265787	266153
263269	263657	264083	264559	264959	265381	265807	266159
263273	263677	264091	264577	264961	265399	265813	266177
263287	263723	264101	264581	264977	265403	265819	266183
263293	263729	264113	264599	264991	265417	265831	266221
263303	263737	264127	264601	264997	265423	265841	266239
263323	263759	264133	264619	265003	265427	265847	266261
263369	263761	264137	264631	265007	265451	265861	266269
263383	263803	264139	264637	265021	265459	265871	266281
263387	263819	264167	264643	265037	265471	265873	266291

266293	266719	267187	267517	267803	268267	268781	269141
266297	266759	267193	267521	267811	268271	268783	269167
266333	266767	267199	267523	267829	268283	268789	269177
266351	266797	267203	267541	267833	268291	268811	269179
266353	266801	267217	267551	267857	268297	268813	269183
266359	266821	267227	267557	267863	268343	268817	269189
266369	266837	267229	267569	267877	268403	268819	269201
266381	266839	267233	267581	267887	268439	268823	269209
266401	266863	267259	267587	267893	268459	268841	269219
266411	266867	267271	267593	267899	268487	268843	269221
266417	266891	267277	267601	267901	268493	268861	269231
266447	266897	267299	267611	267907	268501	268883	269237
266449	266899	267301	267613	267913	268507	268897	269251
266477	266909	267307	267629	267929	268517	268909	269257
266479	266921	267317	267637	267941	268519	268913	269281
266489	266927	267341	267643	267959	268529	268921	269317
266491	266933	267353	267647	267961	268531	268927	269327
266521	266947	267373	267649	268003	268537	268937	269333
266549	266953	267389	267661	268013	268547	268969	269341
266587	266957	267391	267667	268043	268573	268973	269351
266599	266971	267401	267671	268049	268607	268979	269377
266603	266977	267403	267677	268063	268613	268993	269383
266633	266983	267413	267679	268069	268637	268997	269387
266641	266993	267419	267713	268091	268643	268999	269389
266647	266999	267431	267719	268123	268661	269023	269393
266663	267017	267433	267721	268133	268693	269029	269413
266671	267037	267439	267727	268153	268721	269039	269419
266677	267049	267451	267737	268171	268729	269041	269429
266681	267097	267469	267739	268189	268733	269057	269431
266683	267131	267479	267749	268199	268747	269063	269441
266687	267133	267481	267763	268207	268757	269069	269461
266689	267139	267493	267781	268211	268759	269089	269473
266701	267143	267497	267791	268237	268771	269117	269513
266711	267167	267511	267797	268253	268777	269131	269519

269527	270001	270407	270791	271231	271657	272131	272449
269539	270029	270421	270797	271241	271693	272141	272453
269543	270031	270437	270799	271253	271703	272171	272477
269561	270037	270443	270821	271261	271723	272179	272507
269573	270059	270451	270833	271273	271729	272183	272533
269579	270071	270461	270841	271277	271753	272189	272537
269597	270073	270463	270859	271279	271769	272191	272539
269617	270097	270493	270899	271289	271771	272201	272549
269623	270121	270509	270913	271333	271787	272203	272563
269641	270131	270527	270923	271351	271807	272227	272567
269651	270133	270539	270931	271357	271811	272231	272581
269663	270143	270547	270937	271363	271829	272249	272603
269683	270157	270551	270953	271367	271841	272257	272621
269701	270163	270553	270961	271393	271849	272263	272651
269713	270167	270563	270967	271409	271853	272267	272659
269719	270191	270577	270973	271429	271861	272269	272683
269723	270209	270583	271003	271451	271867	272287	272693
269741	270217	270587	271013	271463	271879	272299	272717
269749	270223	270593	271021	271471	271897	272317	272719
269761	270229	270601	271027	271483	271903	272329	272737
269779	270239	270619	271043	271489	271919	272333	272759
269783	270241	270631	271057	271499	271927	272341	272761
269791	270269	270653	271067	271501	271939	272347	272771
269851	270271	270659	271079	271517	271967	272351	272777
269879	270287	270667	271097	271549	271969	272353	272807
269887	270299	270679	271109	271553	271981	272359	272809
269891	270307	270689	271127	271571	272003	272369	272813
269897	270311	270701	271129	271573	272009	272381	272863
269923	270323	270709	271163	271597	272011	272383	272879
269939	270329	270719	271169	271603	272029	272399	272887
269947	270337	270737	271177	271619	272039	272407	272903
269953	270343	270749	271181	271637	272053	272411	272911
269981	270371	270761	271211	271639	272059	272417	272917
269987	270379	270763	271217	271651	272093	272423	272927

272933	273323	273901	274271	274783	275159	275573	275981
272959	273349	273913	274277	274787	275161	275579	275987
272971	273359	273919	274283	274811	275167	275581	275999
272981	273367	273929	274301	274817	275183	275591	276007
272983	273433	273941	274333	274829	275201	275593	276011
272989	273457	273943	274349	274831	275207	275599	276019
272999	273473	273967	274357	274837	275227	275623	276037
273001	273503	273971	274361	274843	275251	275641	276041
273029	273517	273979	274403	274847	275263	275651	276043
273043	273521	273997	274423	274853	275269	275657	276047
273047	273527	274007	274441	274861	275299	275669	276049
273059	273551	274019	274451	274867	275309	275677	276079
273061	273569	274033	274453	274871	275321	275699	276083
273067	273601	274061	274457	274889	275323	275711	276091
273073	273613	274069	274471	274909	275339	275719	276113
273083	273617	274081	274489	274931	275357	275729	276137
273107	273629	274093	274517	274943	275371	275741	276151
273113	273641	274103	274529	274951	275389	275767	276173
273127	273643	274117	274579	274957	275393	275773	276181
273131	273653	274121	274583	274961	275399	275783	276187
273149	273697	274123	274591	274973	275419	275813	276191
273157	273709	274139	274609	274993	275423	275827	276209
273181	273719	274147	274627	275003	275447	275837	276229
273187	273727	274163	274661	275027	275449	275881	276239
273193	273739	274171	274667	275039	275453	275897	276247
273233	273773	274177	274679	275047	275459	275911	276251
273253	273787	274187	274693	275053	275461	275917	276257
273269	273797	274199	274697	275059	275489	275921	276277
273271	273803	274201	274709	275083	275491	275923	276293
273281	273821	274213	274711	275087	275503	275929	276319
273283	273827	274223	274723	275129	275521	275939	276323
273289	273857	274237	274739	275131	275531	275941	276337
273311	273881	274243	274751	275147	275543	275963	276343
273313	273899	274259	274777	275153	275549	275969	276347

276359	276817	277223	277663	278143	278563	278917	279451
276371	276821	277231	277687	278147	278581	278947	279479
276373	276823	277247	277691	278149	278591	278981	279481
276389	276827	277259	277703	278177	278609	279001	279511
276401	276833	277261	277741	278191	278611	279007	279523
276439	276839	277273	277747	278207	278617	279023	279541
276443	276847	277279	277751	278209	278623	279029	279551
276449	276869	277297	277757	278219	278627	279047	279553
276461	276883	277301	277787	278227	278639	279073	279557
276467	276901	277309	277789	278233	278651	279109	279571
276487	276907	277331	277793	278237	278671	279119	279577
276499	276917	277363	277813	278261	278687	279121	279583
276503	276919	277373	277829	278269	278689	279127	279593
276517	276929	277411	277847	278279	278701	279131	279607
276527	276949	277421	277859	278321	278717	279137	279613
276553	276953	277427	277883	278329	278741	279143	279619
276557	276961	277429	277889	278347	278743	279173	279637
276581	276977	277483	277891	278353	278753	279179	279641
276587	277003	277493	277897	278363	278767	279187	279649
276589	277007	277499	277903	278387	278801	279203	279659
276593	277021	277513	277919	278393	278807	279211	279679
276599	277051	277531	277961	278413	278809	279221	279689
276623	277063	277547	277993	278437	278813	279269	279707
276629	277073	277549	277999	278459	278819	279311	279709
276637	277087	277567	278017	278479	278827	279317	279731
276671	277097	277577	278029	278489	278843	279329	279751
276673	277099	277579	278041	278491	278849	279337	279761
276707	277157	277597	278051	278497	278867	279353	279767
276721	277163	277601	278063	278501	278879	279397	279779
276739	277169	277603	278071	278503	278881	279407	279817
276763	277177	277637	278087	278543	278891	279413	279823
276767	277183	277639	278111	278549	278903	279421	279847
276779	277213	277643	278119	278557	278909	279431	279857
276781	277217	277657	278123	278561	278911	279443	279863

279883	280321	280717	281131	281557	281893	282311	282769
279913	280327	280729	281153	281563	281921	282313	282773
279919	280337	280751	281159	281579	281923	282349	282797
279941	280339	280759	281167	281581	281927	282377	282809
279949	280351	280769	281189	281609	281933	282383	282827
279967	280373	280771	281191	281621	281947	282389	282833
279977	280409	280811	281207	281623	281959	282391	282847
279991	280411	280817	281227	281627	281971	282407	282851
280001	280451	280837	281233	281641	281989	282409	282869
280009	280463	280843	281243	281647	281993	282413	282881
280013	280487	280859	281249	281651	282001	282427	282889
280031	280499	280871	281251	281653	282011	282439	282907
280037	280507	280879	281273	281663	282019	282461	282911
280061	280513	280883	281279	281669	282053	282481	282913
280069	280537	280897	281291	281683	282059	282487	282917
280097	280541	280909	281297	281717	282071	282493	282959
280099	280547	280913	281317	281719	282089	282559	282973
280103	280549	280921	281321	281737	282091	282563	282977
280121	280561	280927	281327	281747	282097	282571	282991
280129	280583	280933	281339	281761	282101	282577	283001
280139	280589	280939	281353	281767	282103	282589	283007
280183	280591	280949	281357	281777	282127	282599	283009
280187	280597	280957	281363	281783	282143	282617	283027
280199	280603	280963	281381	281791	282157	282661	283051
280207	280607	280967	281419	281797	282167	282671	283079
280219	280613	280979	281423	281803	282221	282677	283093
280223	280627	280997	281429	281807	282229	282679	283097
280229	280639	281023	281431	281833	282239	282683	283099
280243	280673	281033	281509	281837	282241	282691	283111
280249	280681	281053	281527	281839	282253	282697	283117
280253	280697	281063	281531	281849	282281	282703	283121
280277	280699	281069	281539	281857	282287	282707	283133
280297	280703	281081	281549	281867	282299	282713	283139
280303	280711	281117	281551	281887	282307	282767	283159

283163	283687	284131	284521	284833	285289	285721	286249
283181	283697	284149	284527	284839	285301	285731	286289
283183	283721	284153	284539	284857	285317	285749	286301
283193	283741	284159	284551	284881	285343	285757	286333
283207	283763	284161	284561	284897	285377	285763	286367
283211	283769	284173	284573	284899	285421	285767	286369
283267	283771	284191	284587	284917	285433	285773	286381
283277	283793	284201	284591	284927	285451	285781	286393
283289	283799	284227	284593	284957	285457	285823	286397
283303	283807	284231	284623	284969	285463	285827	286411
283369	283813	284233	284633	284989	285469	285839	286421
283397	283817	284237	284651	285007	285473	285841	286427
283403	283831	284243	284657	285023	285497	285871	286453
283411	283837	284261	284659	285031	285517	285937	286457
283447	283859	284267	284681	285049	285521	285949	286459
283463	283861	284269	284689	285071	285533	285953	286469
283487	283873	284293	284701	285079	285539	285977	286477
283489	283909	284311	284707	285091	285553	285979	286483
283501	283937	284341	284723	285101	285557	285983	286487
283511	283949	284357	284729	285113	285559	285997	286493
283519	283957	284369	284731	285119	285569	286001	286499
283541	283961	284377	284737	285121	285599	286009	286513
283553	283979	284387	284741	285139	285611	286019	286519
283571	284003	284407	284743	285151	285613	286043	286541
283573	284023	284413	284747	285161	285629	286049	286543
283579	284041	284423	284749	285179	285631	286061	286547
283583	284051	284429	284759	285191	285641	286063	286553
283601	284057	284447	284777	285199	285643	286073	286589
283607	284059	284467	284783	285221	285661	286103	286591
283609	284083	284477	284803	285227	285667	286129	286609
283631	284093	284483	284807	285251	285673	286163	286613
283637	284111	284489	284813	285281	285697	286171	286619
283639	284117	284507	284819	285283	285707	286199	286633
283669	284129	284509	284831	285287	285709	286243	286651

286673	287149	287597	288137	288559	288997	289319	289771
286687	287159	287611	288179	288571	289001	289343	289789
286697	287167	287629	288181	288577	289019	289349	289837
286703	287173	287669	288191	288583	289021	289361	289841
286711	287179	287671	288199	288647	289031	289369	289843
286721	287191	287681	288203	288649	289033	289381	289847
286733	287219	287689	288209	288653	289039	289397	289853
286751	287233	287701	288227	288661	289049	289417	289859
286753	287237	287731	288241	288679	289063	289423	289871
286763	287239	287747	288247	288683	289067	289439	289889
286771	287251	287783	288257	288689	289099	289453	289897
286777	287257	287789	288283	288697	289103	289463	289937
286789	287269	287801	288293	288731	289109	289469	289951
286801	287279	287813	288307	288733	289111	289477	289957
286813	287281	287821	288313	288751	289127	289489	289967
286831	287291	287849	288317	288767	289129	289511	289973
286859	287297	287851	288349	288773	289139	289543	289987
286873	287321	287857	288359	288803	289141	289559	289999
286927	287327	287863	288361	288817	289151	289573	290011
286973	287333	287867	288383	288823	289169	289577	290021
286981	287341	287873	288389	288833	289171	289589	290023
286987	287347	287887	288403	288839	289181	289603	290027
286999	287383	287921	288413	288851	289189	289607	290033
287003	287387	287933	288427	288853	289193	289637	290039
287047	287393	287939	288433	288877	289213	289643	290041
287057	287437	287977	288461	288907	289241	289657	290047
287059	287449	288007	288467	288913	289243	289669	290057
287087	287491	288023	288481	288929	289249	289717	290083
287093	287501	288049	288493	288931	289253	289721	290107
287099	287503	288053	288499	288947	289273	289727	290113
287107	287537	288061	288527	288973	289283	289733	290119
287117	287549	288077	288529	288979	289291	289741	290137
287137	287557	288089	288539	288989	289297	289759	290141
287141	287579	288109	288551	288991	289309	289763	290161

290183	290611	291007	291437	291877	292351	292753	293207
290189	290617	291013	291439	291887	292363	292759	293213
290201	290621	291037	291443	291899	292367	292777	293221
290209	290623	291041	291457	291901	292381	292793	293257
290219	290627	291043	291481	291923	292393	292801	293261
290233	290657	291077	291491	291971	292427	292807	293263
290243	290659	291089	291503	291979	292441	292819	293269
290249	290663	291101	291509	291983	292459	292837	293311
290317	290669	291103	291521	291997	292469	292841	293329
290327	290671	291107	291539	292021	292471	292849	293339
290347	290677	291113	291547	292027	292477	292867	293351
290351	290701	291143	291559	292037	292483	292879	293357
290359	290707	291167	291563	292057	292489	292909	293399
290369	290711	291169	291569	292069	292493	292921	293413
290383	290737	291173	291619	292079	292517	292933	293431
290393	290761	291191	291647	292081	292531	292969	293441
290399	290767	291199	291649	292091	292541	292973	293453
290419	290791	291209	291661	292093	292549	292979	293459
290429	290803	291217	291677	292133	292561	292993	293467
290441	290821	291253	291689	292141	292573	293021	293473
290443	290827	291257	291691	292147	292577	293071	293483
290447	290837	291271	291701	292157	292601	293081	293507
290471	290839	291287	291721	292181	292627	293087	293543
290473	290861	291293	291727	292183	292631	293093	293599
290489	290869	291299	291743	292223	292661	293099	293603
290497	290879	291331	291751	292231	292667	293107	293617
290509	290897	291337	291779	292241	292673	293123	293621
290527	290923	291349	291791	292249	292679	293129	293633
290531	290959	291359	291817	292267	292693	293147	293639
290533	290963	291367	291829	292283	292703	293149	293651
290539	290971	291371	291833	292301	292709	293173	293659
290557	290987	291373	291853	292309	292711	293177	293677
290593	290993	291377	291857	292319	292717	293179	293681
290597	290999	291419	291869	292343	292727	293201	293701

293717	294179	294551	294991	295433	295903	296347	296741
293723	294181	294563	294997	295439	295909	296353	296749
293729	294199	294629	295007	295441	295937	296363	296753
293749	294211	294641	295033	295459	295943	296369	296767
293767	294223	294647	295037	295513	295949	296377	296771
293773	294227	294649	295039	295517	295951	296437	296773
293791	294241	294659	295049	295541	295961	296441	296797
293803	294247	294673	295073	295553	295973	296473	296801
293827	294251	294703	295079	295567	295993	296477	296819
293831	294269	294731	295081	295571	296011	296479	296827
293861	294277	294751	295111	295591	296017	296489	296831
293863	294289	294757	295123	295601	296027	296503	296833
293893	294293	294761	295129	295663	296041	296507	296843
293899	294311	294773	295153	295693	296047	296509	296909
293941	294313	294781	295187	295699	296071	296519	296911
293957	294317	294787	295199	295703	296083	296551	296921
293983	294319	294793	295201	295727	296099	296557	296929
293989	294337	294799	295219	295751	296117	296561	296941
293999	294341	294803	295237	295759	296129	296563	296969
294001	294347	294809	295247	295769	296137	296579	296971
294013	294353	294821	295259	295777	296159	296581	296981
294023	294383	294829	295271	295787	296183	296587	296983
294029	294391	294859	295277	295819	296201	296591	296987
294043	294397	294869	295283	295831	296213	296627	297019
294053	294403	294887	295291	295837	296221	296651	297023
294059	294431	294893	295313	295843	296237	296663	297049
294067	294439	294911	295319	295847	296243	296669	297061
294103	294461	294919	295333	295853	296249	296683	297067
294127	294467	294923	295357	295861	296251	296687	297079
294131	294479	294947	295363	295871	296269	296693	297083
294149	294499	294949	295387	295873	296273	296713	297097
294157	294509	294953	295411	295877	296279	296719	297113
294167	294523	294979	295417	295879	296287	296729	297133
294169	294529	294989	295429	295901	296299	296731	297151

297161	297581	297907	298237	298631	299011	299357	299681
297169	297589	297911	298247	298651	299017	299359	299683
297191	297601	297931	298261	298667	299027	299363	299699
297233	297607	297953	298283	298679	299029	299371	299701
297247	297613	297967	298303	298681	299053	299389	299711
297251	297617	297971	298307	298687	299059	299393	299723
297257	297623	297989	298327	298691	299063	299401	299731
297263	297629	297991	298339	298693	299087	299417	299743
297289	297641	298013	298343	298709	299099	299419	299749
297317	297659	298021	298349	298723	299107	299447	299771
297359	297683	298031	298369	298733	299113	299471	299777
297371	297691	298043	298373	298757	299137	299473	299807
297377	297707	298049	298399	298759	299147	299477	299843
297391	297719	298063	298409	298777	299171	299479	299857
297397	297727	298087	298411	298799	299179	299501	299861
297403	297757	298093	298427	298801	299191	299513	299881
297421	297779	298099	298451	298817	299197	299521	299891
297439	297793	298153	298477	298819	299213	299527	299903
297457	297797	298157	298483	298841	299239	299539	299909
297467	297809	298159	298513	298847	299261	299567	299933
297469	297811	298169	298559	298853	299281	299569	299941
297481	297833	298171	298579	298861	299287	299603	299951
297487	297841	298187	298583	298897	299311	299617	299969
297503	297853	298201	298589	298937	299317	299623	299977
297509	297881	298211	298601	298943	299329	299653	299983
297523	297889	298213	298607	298993	299333	299671	299993
297533	297893	298223	298621	298999			

[G e n e r a l I n f o r m a t i o n]

书名 = 素数及其快速判定的新方法与应用

作者 =

页数 = 1 4 2

S S 号 = 1 1 1 0 9 5 2 1

出版日期 =

封面
书名
版权
前言
目录
正文